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Architectural & Environmental Consultants

Acoustics | Vibration | Air Quality

Noise Assessment for Planning Condition 13

Sparkle Street, Manchester

Cass Allen
01234 834 862
www.cassallen.co.uk

Noise Assessment for Planning Condition 13

Project: SPARKLE STREET, MANCHESTER

Report reference: RP01-23244-R0

Client:
FORAS (SPARKLE STREET) LTD
4 ELSTREE WAY
BOREHAMWOOD
HERTFORDSHIRE
WD6 1RN

Our details:
CASS ALLEN ASSOCIATES LTD
BEDFORD I-LAB
BEDFORD
MK44 3RZ

Document control:

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0	29 January 2026	Nathan Hyde, BSc (Hons), Acoustics Consultant	Tim Ives, PhD BEng CEng FIOA, Director	Initial issue

Cass Allen
01234 834 862
www.cassallen.co.uk

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1. EXECUTIVE SUMMARY

1.1 Cass Allen has been instructed by Foras (Sparkle Street) Ltd to assess the acoustic design of a new development at Sparkle Street, Manchester.

1.2 The assessment was carried out in accordance with relevant local and national planning guidance and acoustics standards.

1.3 A noise and vibration survey was carried out at the site. Noise levels at the site are dictated by road traffic noise emissions from Store Street and, to a lesser extent, Sparkle Street.

1.4 A 3D noise model of the development was constructed based on the results of a site noise survey. The noise model was used to calculate road traffic noise levels at all facades of the development.

1.5 Noise affecting the development has been assessed in accordance with the ProPG guidance and noise-related Planning Condition 13(a). The design of the development is considered to be acceptable and complaint with Planning Condition 13(a) subject to the adoption of acoustically upgraded glazing and ventilation.

1.6 Noise from Building services has been assessed in accordance with Planning Condition 13(a). The design of the development is considered to be acceptable subject to the adoption of attenuators where required.

1.7 Noise from commercial usage on the ground floor has been considered however, due to a lack of details, this will need to be reviewed once details are available.

1.8 Ground-borne noise and vibration levels at the site have been measured and are considered to be acceptable for the development.

1.9 It is our view that this report contains the information required to discharge the noise and vibration related planning condition on the development.

2. INTRODUCTION

2.1 Cass Allen has been instructed by Foras (Sparkle Street) Ltd to assess the acoustic design of a new development at Sparkle Street, Manchester.

2.2 The assessment has been carried out in accordance with the requirements of noise-related Planning Condition 13(a) that have been imposed on the development. Condition 13(a) states:

(a) Notwithstanding the details submitted as set out in the Noise Assessment Report Sparkle Street, Manchester by Cass Allen 19-04-24 prior to commencement of above ground works a final scheme for acoustically insulation and mechanically ventilating the residential accommodation against local traffic network, any local commercial/industrial premises and any service risers/lift shafts; details of the MVHR system (plan,intake/extract points, silencers, operational noise levels) and details of the performance of the glazing shall be submitted to and approved in writing by the City Council as Local Planning Authority.

The approved noise insulation scheme shall be completed before the occupation of the residential accommodation hereby approved. The potential for overheating shall also be assessed and the noise insulation scheme shall take this into account. Noise survey data must include measurements taken during rush-hour period and night time to determine appropriate sound insulation measures necessary. The following noise criteria will be required to be achieved:

Bedrooms (night time – 23:00 – 07:00) 30 dB LAeq (individual noise events shall not exceed 45 dB LAmax,F by more than 15 times)
Living Rooms (daytime – 07:00 – 23:00) 35 dB LAeq
For vibration criteria to apply which can be found in BS6472:2008 "Guide to evalucation of human exposure to vibration in buildings". Groundbourne noise/re-raidiated noise shall also be factored into the assessment and design.

2.3 This report contains technical terminology; a glossary of terms can be found at www.cassallen.co.uk/glossary.

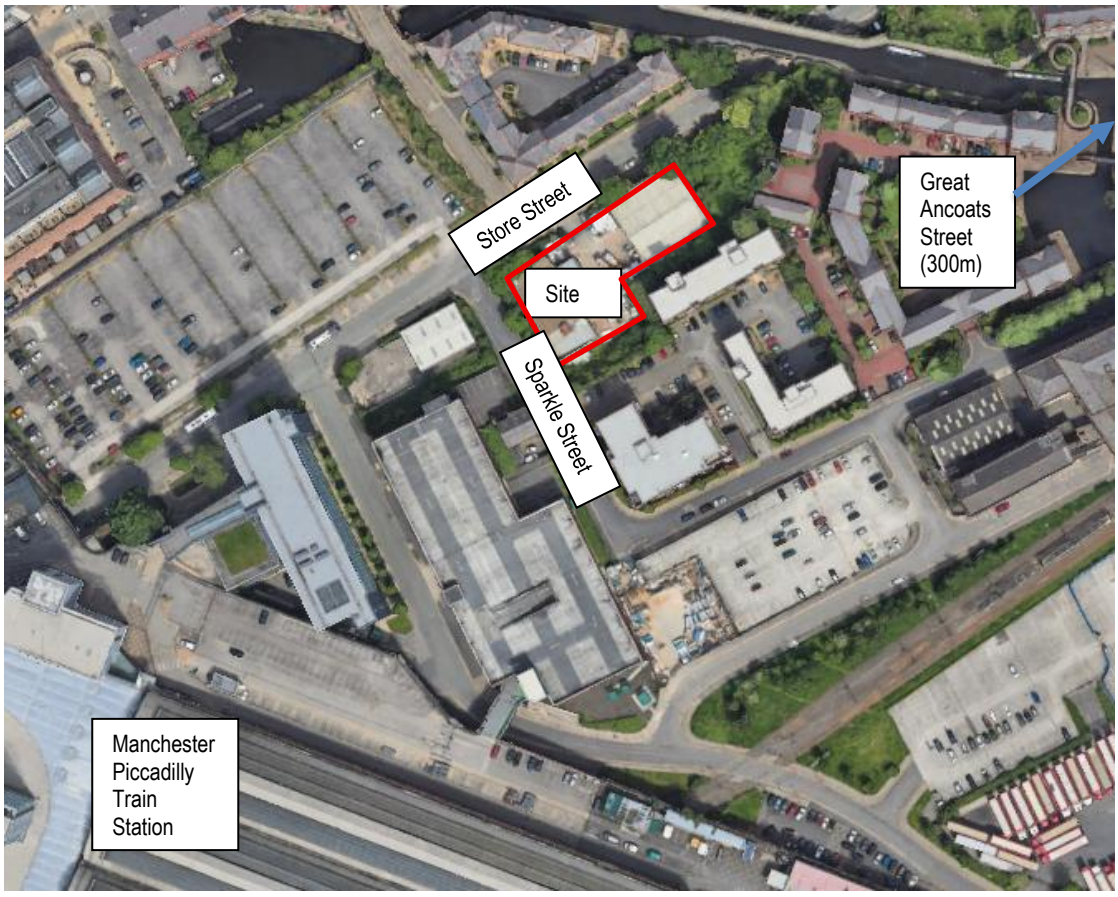
3. DEVELOPMENT DESCRIPTION

3.1 The development comprises residential properties and commercial uses on the ground floor. A current drawing of the development layout is shown in Appendix 1.

3.2 The site is located in a mixed-use area, bounded to the west by Sparkle Street and to the north by Store Street. To the west and south of the site is the Manchester Piccadilly Train Station. To the north and east of the site is the Great Ancoats Street. To the south of the site is a residential area.

3.3 The site location and surrounding area is shown in Figure 1 below.

Figure 1 Site Location and Surrounding Area



3.4 To address the requirements of the noise and vibration related planning conditions, the following matters have been assessed:

- noise affecting the habitable areas of the development and the design of the external facades (as per Planning Condition 13(a))
- ground-borne vibration affecting the habitable areas of the proposed development (as per Planning Condition 13(a))

- the sound insulation between dwellings and commercial parts of the development (as per Planning Condition 13(a))
- noise emissions from building services associated with the development within the apartments of the development they are serving (as per Planning Condition 13(a))

3.5 The above matters are discussed in turn in the following sections of this report.

4. NOISE AFFECTING THE DEVELOPMENT

4.1 The noise levels that will exist within the habitable areas of the finished development have been predicted based on the existing noise environment at the site and details for the design of the development. The predicted noise levels have then been compared with appropriate design criteria. Suitable mitigation measures have been identified where necessary to achieve acceptable noise levels.

Design criteria – Internal noise levels

4.2 Appropriate design criteria for acceptable noise levels in acoustically sensitive areas of new developments are given in BS8233:2014 '*Guidance on sound insulation and noise reduction for buildings*'.

4.3 Relevant BS8233 design criteria are summarised in Table 1 below.

Table 1 BS8233:2014 Internal Noise Criteria

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB LAeq,16hour	-
Dining	Dining room/area	40 dB LAeq,16hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16hour	30 dB LAeq,8hour

4.4 BS8233 also states that it is desirable that noise levels in external amenity areas of residential developments do not exceed 50 dB LAeq and that 55 dB LAeq,T should be regarded as an upper guideline value. BS8233 recognises however that these guideline values will not always be achievable in city centres or urban areas adjoining main roads or other transport sources. In these cases, BS8233 states that the development should be designed to achieve the lowest practical noise levels in the amenity spaces.

Existing site noise levels

4.5 A noise survey was carried out at the site from 2-10 May 2023 to assess existing noise levels in the area. The full methodology and results of the noise survey are provided in Appendix 2.

4.6 Average noise levels (LAeq) across the site were generally dictated by road traffic on road traffic on Store Street and Sparkle Street

4.7 Maximum noise levels (LAmax) at the north of the site were largely dictated by fast car passes along Store Street and Sparkle Street

4.8 Background noise levels (LA90) across the site were dictated by constant road traffic noise from surrounding roads.

4.9 Areas of the development at the northern edge of the site will be subject to the highest noise levels due to road traffic on Store Street. The noise survey results show that noise levels at this position are as follows:

- Average noise levels during the daytime - 65 dB LAeq,0700-2300hrs;
- Average noise levels during the night-time - 62 dB LAeq,2300-0700hrs;
- Typical maximum noise levels during the night-time - 78 dB LAmax.

4.10 Based on the results of the site noise survey, a 3D computer noise model was developed to predict and assess the noise levels that will exist across the entire development.

4.11 The 3D noise model was developed using Cadna/A v2023 environmental noise modelling software. Cadna/A incorporates the calculation methodology outlined in the Department of Transport Welsh Office - *Calculation of Road Traffic Noise* (CRTN) for the assessment of road traffic noise propagation and CRN for rail noise.

4.12 The layout of the development and surrounding area was input into the model. To calculate the spread of noise levels around the site, day-time average noise levels were input for the surrounding sources (e.g. Store Street, Sparkle Street, tram and railway) and calibrated to the results of the on-site noise measurements.

4.13 The methodology and results of the noise modelling are provided in Appendix 3. It can be seen from the modelling results that noise levels will be highest on facades of the development facing Store Street and lowest on south eastern facing facades overlooking existing residential.

Internal noise levels in noise-sensitive rooms

4.14 The external walls of the development will be constructed using a standard masonry construction (e.g. 102mm brick, 100mm insulated cavity, 100mm concrete block). Consequently, internal noise levels will be dictated by external noise ingress via glazing and ventilators.

4.15 The current use of the ground floor commercial area is not yet finalised, as such an assessment of noise transfer into residential areas above cannot accurately be carried out. The slab thickness between the two areas is 225mm which provides a very high sound insulation performance of 51 dB Rw+Ctr, as such it should be reasonably straightforward to provide sufficient control of commercial noise into the residential above. Once the use of the commercial space is finalised the design will be reviewed to ensure adequate noise mitigation is included.

4.16 Background ventilation for the development will be provided by mechanical ventilation with heat recovery (MVHR) systems with no direct penetrations in the facade for ventilation into habitable rooms

4.17 Noise levels due to building services have been designed to comply with the noise limits specified within Planning Condition 13(a) when operating in trickle mode (i.e. to replace trickle ventilators). The criteria given within Planning Condition 13(a) are as follows:

- Bedrooms – 30 dB LAeq,T and 45 dB LAmax,F by more than 15 times between 23:00 – 07:00
- Living rooms – 35 dB LAeq,T between 07:00 – 23:00

4.18 To ensure cumulative noise within the bedrooms complies with the criteria specified within Planning Condition 13(a) a reduction of 3 dB has been accounted for to ensure noise break-in through the façade and building services noise do not cumulatively exceed the criteria.

4.19 Different internal noise criteria for the Boost and Overheating modes of the proposed MVHR have been adopted. These limits were developed based on the internal noise limits provided within Part O of the Building Regulations and BS8233:2014 and only apply to Bedrooms. The limits for Boost and Overheating mode are:

- Boost – 35 dB LAeq,T between 23:00 – 07:00
- Overheating – 40 dB LAeq,T between 23:00 – 07:00

4.20 Several typical duct layouts were selected to capture the range of different duct lengths, these typical duct layouts are given in Appendix 6. Each apartment has a single MVHR unit (Vent-Axia Lo-Carbon Sentinel Kinetic Plus), The Noise Data for this unit is provided within Appendix 7. The MVHR unit will be operating at 50% when in Trickle mode, 60% when in Boost mode and 80% when in Overheating mode. The through-duct noise data is shown in Table 2 below:

Table 2 Noise Emissions from MVHR unit

Mode	Supply/Extract	Octave Band Sound Power Levels dB									SPL @ 3m
		63	125	250	500	1K	2K	4K	8K	LwA	
Trickle	Supply	65	66	66	59	50	42	29	27	61	41
	Extract	59	62	56	48	36	28	21	25	51	31
Boost	Supply	68	68	73	62	53	48	34	28	69	49
	Extract	63	62	60	51	39	32	23	25	54	37
Overheating	Supply	71	71	74	67	58	53	40	33	71	51
	Extract	68	66	72	56	44	37	27	26	64	46

4.21 Attenuators have been specified on both the supply and extract duct runs depending on the length of ductwork between the MVHR unit and the vent serving the room. The specification for the attenuators is shown in Table 3 below:

Table 3 Insertion loss of Ductwork Attenuators (dB)

Attenuator Length	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz
620mm	3	5	10	16	28	44	44
920mm	4	7	14	24	39	51	48
1200mm	5	8	18	32	50	55	52

4.22 Noise levels within habitable rooms have been calculated to be below 27 dBA for Trickle mode and below 35 dBA and 40 dBA for Boost and Overheating mode respectively, therefore are compliant with the criteria given in Section 4.17 and 4.19 respectively.

4.23 Calculations were carried out using facade modelling software in accordance with the "more rigorous" methodology given in BS8233:2014 to establish the sound insulation performance required of the glazing and ventilation to achieve the nominated internal noise criteria in all habitable rooms across the development. The calculations included a 3 dBA design margin.

4.24 The calculations were carried out based on the dimensions/details for facade elements taken from project drawings.

4.25 The results of the calculations are shown in Appendix 4 and are summarised in Table 2 below.

Table 2 Acoustic Requirements for All Habitable Rooms

	Bedrooms		Living rooms/Dining rooms	
Reference	**Glazing Performance Requirements (inc. Frames)**	**Ventilator Performance Requirements (in Open Position)**	**Glazing Performance Requirements (inc. Frames)**	**Ventilator Performance Requirements (in Open Position)**
FS01	36 dB Rw+Ctr	MVHR	30 dB Rw+Ctr	MVHR
FS02	30 dB Rw+Ctr		27 dB Rw+Ctr	
FS03	27 dB Rw+Ctr		27 dB Rw+Ctr	

4.26 Based on the results of the calculations summarised in Table 2 and the measured noise levels at the site (considering both the day and night-time average and maximum noise levels), a specification has been developed showing the sound insulation performance requirements for all facades of the development. The façade specification is shown in Appendix 5.

4.27 The required sound insulation performance values in Table 2 could typically be achieved by the glazing types shown in Table 3.

Table 3 Typical Glazing Acoustic Performances

Glazing (in Good Quality Sealed Frames)	Typical Weighted Sound Reduction (Rw + Ctr)
4/16/4mm standard thermal double glazing	27
6/16/6.4mm thermal double glazing	30
10mm/16/8.8mm acoustically upgraded thermal double glazing	36

Note The acoustic performance of the glazing systems (including frames) should always be confirmed with the manufacturer before selection for installation on site.

4.28 It can be seen from the above that compliance with Planning Condition 13a is predicted to be achieved via the selection of glazing and ventilation systems to achieve the specification given in Appendix 5.

4.29 It should also be noted that any sharing walls between habitable rooms and lift shafts will have an independent wall liner fitted to mitigate any noise break-in from the lift shaft.

Noise levels in external amenity areas

4.30 The design of the development has also been reviewed in relation to the BS8233 recommendation that noise levels in external amenity areas should ideally not exceed 50 – 55 dB LAeq,T.

4.31 The noise survey results indicate that noise levels in external amenity areas (terraces on the first floor and shared gardens on the 10th floor) are predicted to achieve the BS8233 recommended levels. The proposed development is therefore also considered to be acceptable based on noise levels in external amenity areas.

5. GROUND-BORNE VIBRATION AFFECTING THE DEVELOPMENT

5.1 The vibration levels that will exist within the habitable areas of the finished development have been assessed based on the existing ground-borne vibration levels at the site.

Design criteria – Ground-borne vibration and noise

5.2 Appropriate criteria for ground-borne vibration affecting residential dwellings are given in BS 6472-1:2008 *'Guide to evaluation of human exposure to vibration in buildings - Part 1: Vibration sources other than blasting'*. The criteria in BS6472-1 are provided as Vibration Dose Values, as summarised in Table 4.

Table 4 BS6472-1:2008 Vibration Criteria

Place	Low Probability of Adverse Comment (VDV) $m \cdot s^{-1.75}$ 1)	Adverse Comment Possible (VDV) $m \cdot s^{-1.75}$	Adverse Comment Probable (VDV) $m \cdot s^{-1.75}$ 2)
Residential buildings 16 h day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8 h night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

5.3 It is also important to assess reradiated noise levels within the habitable rooms of the finished resulting from ground-borne vibration (referred to as 'ground-borne noise' for the remainder of this report). There is currently no official Government or national guidance for assessing ground-borne noise levels affecting residential developments. As a result, criteria based on guidelines published by the American Public Transit Association (APTA) are widely used in the UK. These criteria are reproduced in Table 5.

Table 5 APTA Guidelines for Ground-Borne Noise Inside Residential Dwellings

Community Area	Maximum A-weighted sound pressure level, dB LASmax	
	Single Family Dwelling	Multi-Family Dwelling
Low Density Residential	30	35
Average Density Residential	35	40
High Density Residential	35	40
Commercial	40	45
Industrial / Highway	40	45

5.4 Measured ground-borne vibration and noise levels at the site have been assessed against the criteria shown in Table 4 and Table 5.

Existing ground-borne vibration levels

5.5 Ground-borne vibration and noise measurements were carried out as part of the site survey. The methodology and results of the measurements are outlined in Appendix 2.

5.6 It is important to note that the nearby train line is elevated and positioned approximately 100m south of the site. The measurements shown in Appendix 2 are therefore more likely to be a result of heavy vehicle passes on the adjacent roads than train passes.

5.7 Tri-axial Vibration Dose Value (VDV) measurements were taken across the low-frequency range (1-80Hz) and logged at 10 second intervals for 30 minutes, to ensure an adequate quantity of train movements were recorded. Timetables indicate that up 47 trains arrived/departed the station during the survey period.

5.8 Using the measured VDV levels during the survey, the total day and night-time VDV levels have been calculated based on the total number of train passes that occur on the railway during the daytime and night-time. The extrapolated VDV levels are summarised below in Table 6:

Table 6 Vibration Data Summary (Vibration Dose Values)

Period	X Axis ($m \cdot s^{-1.75}$) Wd	Y Axis ($m \cdot s^{-1.75}$) Wd	Z Axis ($m \cdot s^{-1.75}$) Wb
Daytime (0700-2300)	0.005	0.004	0.013
Night-time (2300-0700)	0.004	0.004	0.011

5.9 Vibration levels were highest in the vertical z-axis (compared to the X and Y axes).

5.10 It can be seen from a comparison of Table 4 and Table 6 that vibration levels at the site fall well below the *"Low probability of adverse comment"* rating for both day- and night-time periods according to BS6472:1992.

5.11 The results of the BS6472 assessment are in line with subjective opinion formed during the survey that there are insignificant ground-borne vibration levels at the site.

5.12 It is subsequently reasonable to conclude that levels of vibration at the site are acceptable for the proposed development.

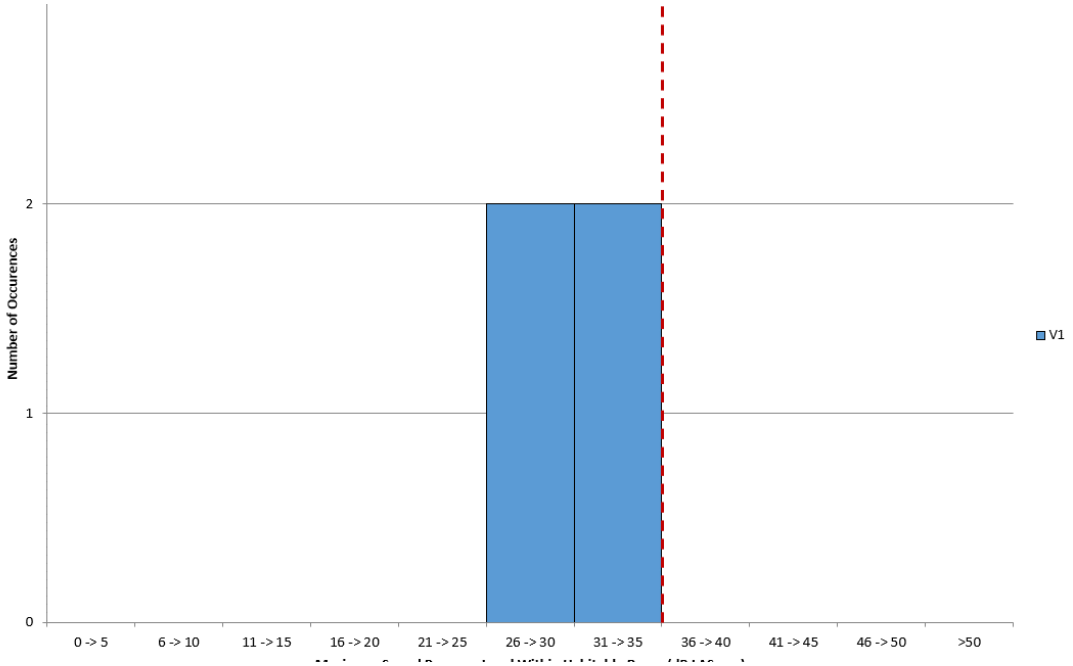
Existing ground-borne noise levels

5.13 Vibration measurements were also taken in the x, y and z-axis in 1/3 octave frequency bands in the audible range (20Hz-16Khz) in order to inform an assessment of ground-borne noise.

5.14 In the absence of any official local or national Governmental assessment guidance, the measured ground-borne noise levels were used to calculate the resultant LASmax noise levels in the 'worst case' habitable rooms of the development in accordance with the Association of Noise Consultants (ANC) Guidelines – *"Measurement & Assessment of Groundborne Noise & Vibration"*.

5.15 The ANC Guideline document gives correction values for factors affecting the propagation of structure-borne vibration within buildings such as attenuation with storey height. We have assessed at ground floor level therefore no corrections have been applied to the results which are summarised in Figure 2 below.

Figure 2 Predicted Ground-borne Noise Levels (LASmax)



5.16 It can be seen from Figure 2 above that the predicted levels are 25-35 dB LASmax and therefore compliant with APTA Guidelines for all categories under multi-family dwelling. As discussed in paragraph 5.6, these results are likely due to heavy vehicle passes rather than train passes and, in our view, the predicted levels are acceptable.

5.17 In summary, it can be seen from the above that the criterion for reradiated noise is predicted to be achieved in the 'worst-case' dwellings with no additional mitigation measures.

6. CONCLUSIONS

6.1 Cass Allen was instructed by Foras (Sparkle Street) Ltd to assess the acoustic design of the development as required by the planning conditions.

6.2 The assessment was carried out in accordance with relevant local and national planning guidance and acoustics standards.

6.3 Noise levels at the site are dictated by road traffic noise emissions from Store Street and, to a lesser extent, Sparkle Street.

6.4 A 3D noise model of the development was used to calculate road traffic noise levels at all facades of the development.

6.5 Noise affecting the development has been assessed in accordance with the ProPG guidance and the requirements of Planning Condition 13(a). The design of the development is considered to be acceptable subject to the adoption of acoustically upgraded glazing and ventilation.

6.6 Noise from Building services has been assessed in accordance with Planning Condition 13(a). The design of the development is considered to be acceptable subject to the adoption of attenuators where required.

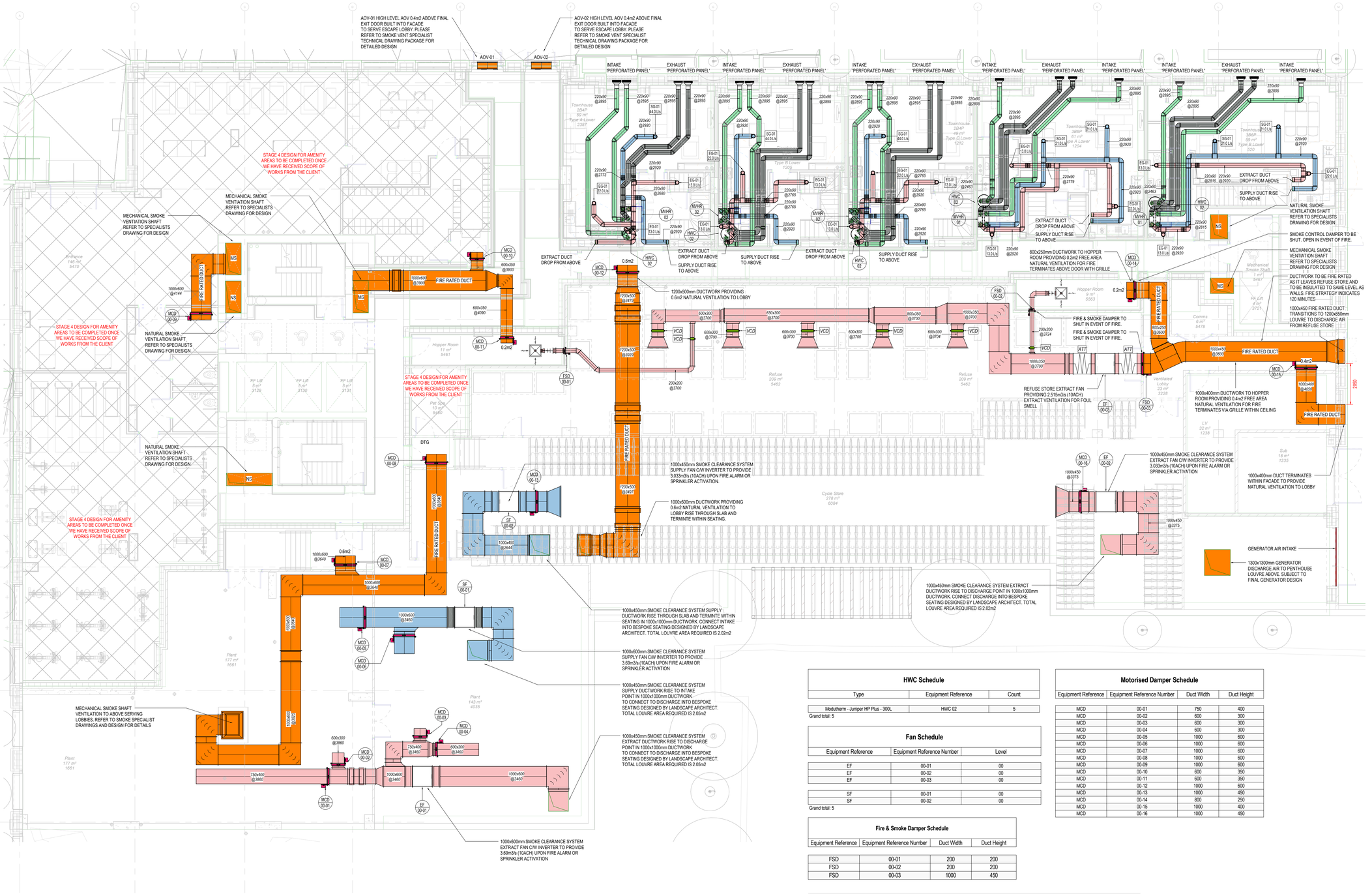
6.7 Noise from commercial usage on the ground floor has been considered however, due to a lack of details, this will need to be reviewed once details are available.

6.8 Ground-borne noise and vibration levels at the site have been measured and are considered to be acceptable for the development.

6.9 It is our view that this report contains the information required to discharge the noise and vibration related planning condition on the development.

Appendix 1 Development Layout

DRAWING NOT TO SCALE



1 00 - Ventilation Services Layout

1 : 100

HWC Schedule

Type	Equipment Reference	Count
Modutherm - Juniper HP Plus - 300L	HWC 02	5

Grand total: 5

Fan Schedule

Equipment Reference	Equipment Reference Number	Level
EF	00-01	00
EF	00-02	00
EF	00-03	00
SF	00-01	00
SF	00-02	00

Grand total: 5

Fire & Smoke Damper Schedule

Equipment Reference	Equipment Reference Number	Duct Width	Duct Height
FSD	00-01	200	200
FSD	00-02	200	200
FSD	00-03	1000	450

MVHR Schedule

Family	Type	Equipment Reference	Level	Count
vent-axia_lo-carbonsentinelkineticplus	Right Hand	MVHR 01	00	2
vent-axia_lo-carbonsentinelkineticplus	Left Hand	MVHR 02	00	3

Grand total: 5

Air Extract Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_150-CircularAirValve-Exhaust	00	10	13.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	00	5	22.0 L/s

Grand total: 15

Air Supply Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_150-CircularAirValve-Supply	00	4	21.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	00	3	44.0 L/s

Grand total: 7

Motorised Damper Schedule

Equipment Reference	Equipment Reference Number	Duct Width	Duct Height
MCD	00-01	750	400
MCD	00-02	600	300
MCD	00-03	600	300
MCD	00-04	600	300
MCD	00-05	1000	600
MCD	00-06	1000	600
MCD	00-07	1000	600
MCD	00-08	1000	600
MCD	00-09	1000	600
MCD	00-10	600	350
MCD	00-11	600	350
MCD	00-12	1000	600
MCD	00-13	1000	450
MCD	00-14	800	250
MCD	00-15	1000	400
MCD	00-16	1000	450

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LIVERPOOL

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P01	Preliminary Issue	19.01.2026

NOTES:

PRELIMINARY

CLIENT: JRL MIDGARD

ARCHITECT: simpsonhaugh

CONTRACT: Sparkle Street

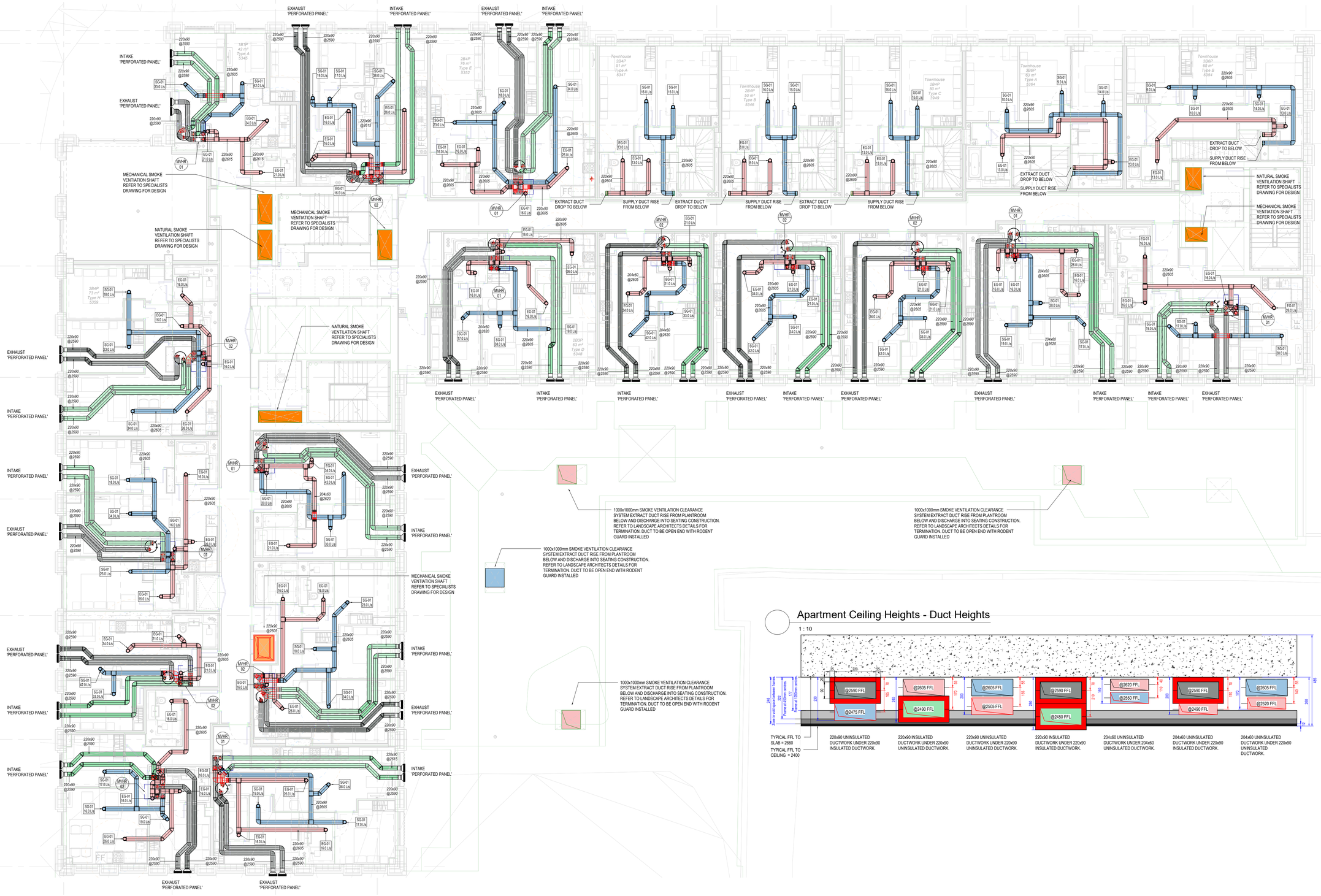
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DATE	DRAWING No	REV
08-09-2025	SPS-ABE-XX-GF-DR-P-57-0001	P01

a-b engineering
Holly Terrace • 9-17 Derby Lane
Old Swan • Liverpool • L13 6QA
tel: 0151 228 4661 • fax: 0151 220 4206
email: info@abeng.co.uk • website:
www.abeng.co.uk

DRAWING NOT TO SCALE



2 01 - Ventilation Services Layout

1 : 100

Apartment Ceiling Heights - Duct Heights

1 : 10

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REVISION	ITEM REVISED	DATE
P01	Preliminary Issue	09.01.2026

CLIENT
JRL MIDGARD

ARCHITECT
simpsonhaugh

CONTRACT
Sparkle Street

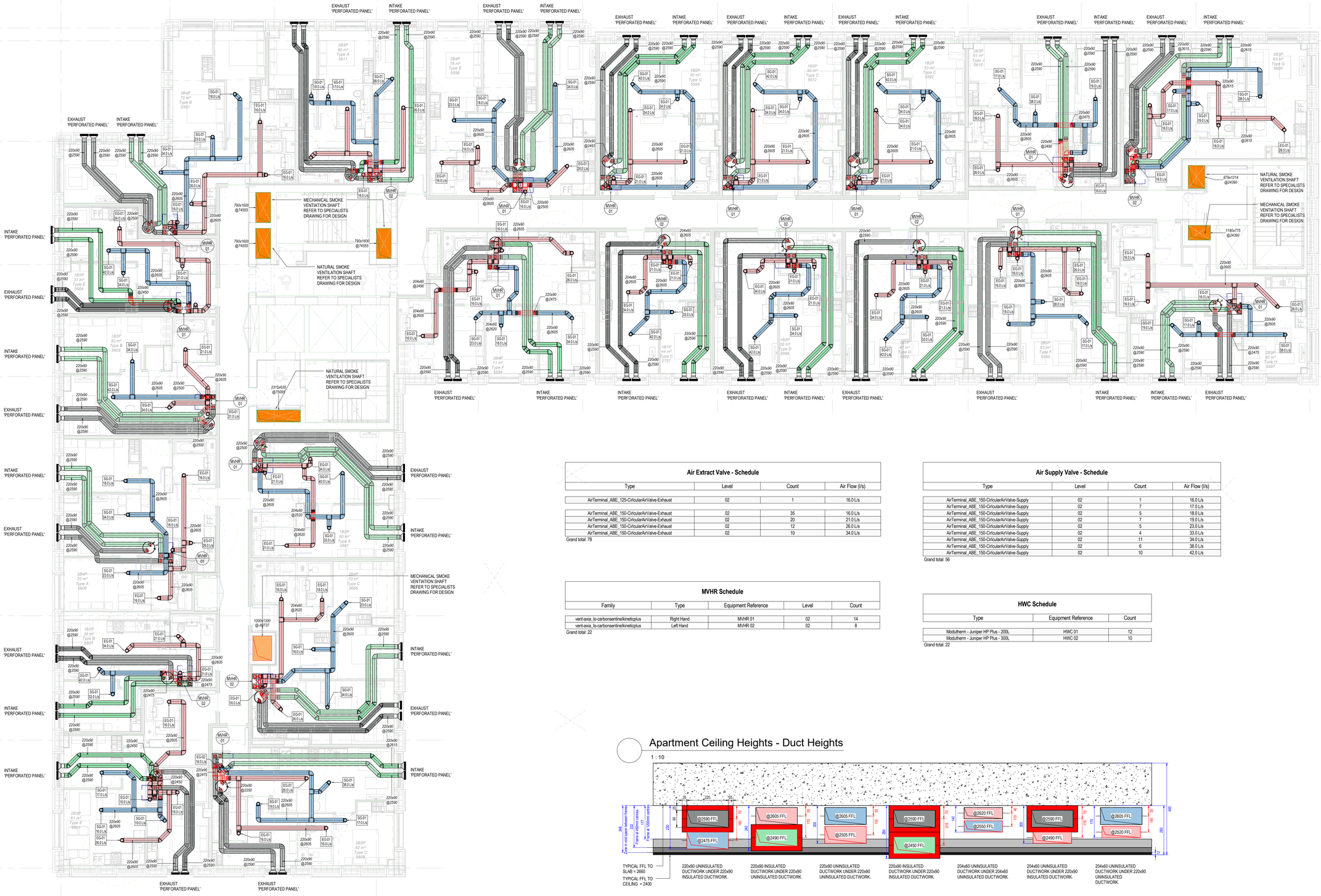
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DATE	DRAWING No	REV
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a-b engineering
Holly Terrace • 9-17 Derby Lane
Old Swan • Liverpool • L13 6QA
T: 0151 228 4661 • F: 0151 220 4206
email: info@abeng.co.uk
website: www.abeng.co.uk

DRAWING NOT TO SCALE



2 02 - Ventilation Services Layout

1 : 100

Air Extract Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_125-CircularAirValve-Exhaust	02	1	16.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	02	35	16.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	02	20	21.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	02	12	26.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	02	10	34.0 L/s

Grand total: 78

Air Supply Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_150-CircularAirValve-Supply	02	1	16.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	02	7	17.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	02	5	18.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	02	7	19.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	02	5	23.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	02	4	33.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	02	11	34.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	02	6	38.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	02	10	42.0 L/s

Grand total: 56

MVHR Schedule

Family	Type	Equipment Reference	Level	Count
vent-axia_lo-carbonsentinelkineticplus	Right Hand	MVHR 01	02	14
vent-axia_lo-carbonsentinelkineticplus	Left Hand	MVHR 02	02	8

Grand total: 22

HWC Schedule

Type	Equipment Reference	Count
Modutherm - Juniper HP Plus - 200L	HWC 01	12
Modutherm - Juniper HP Plus - 300L	HWC 02	10

Grand total: 22

Apartment Ceiling Heights - Duct Heights

1 : 10

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REVISION	ITEM REVISED	DATE
P01	Preliminary Issue	09.01.2026

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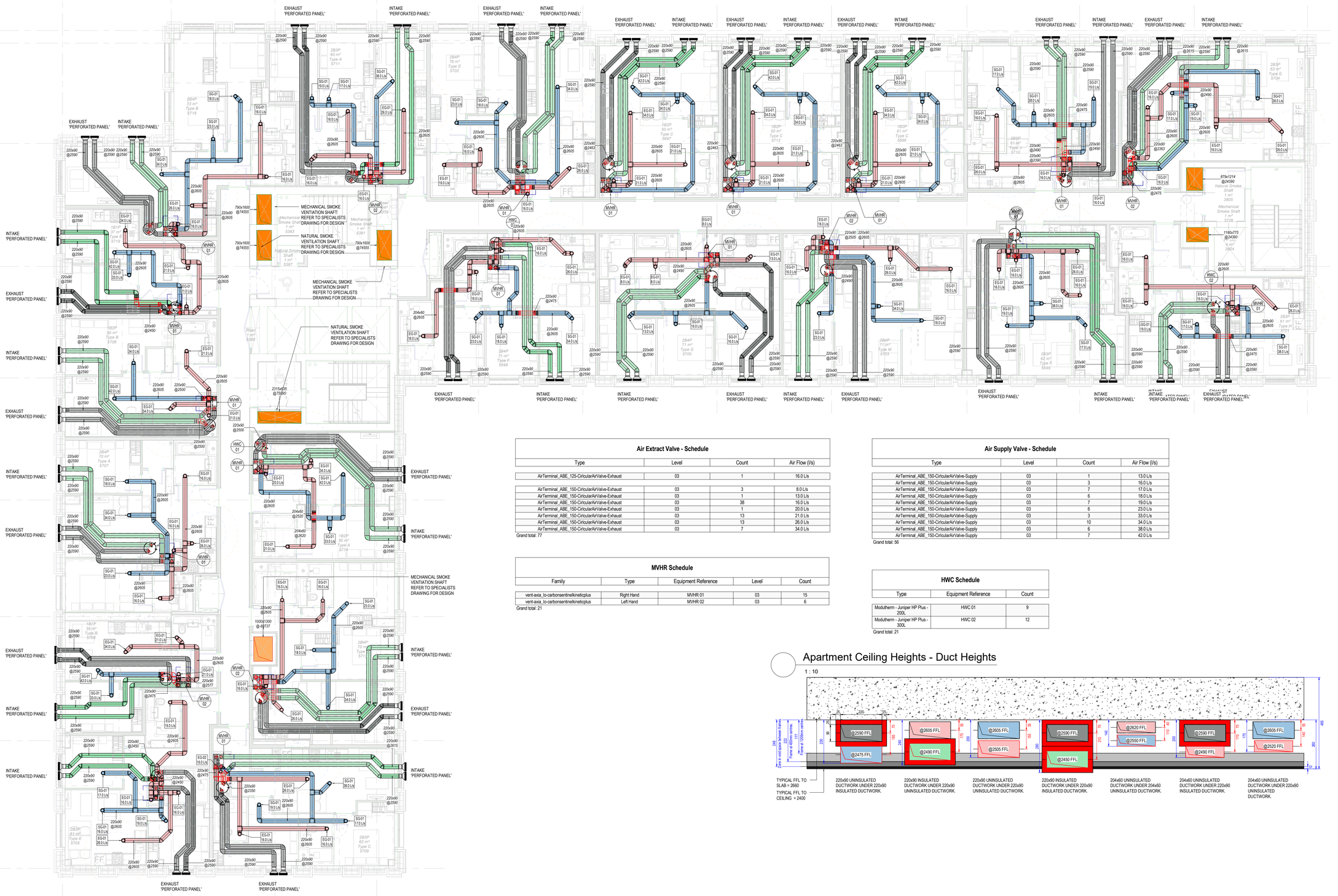
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Ventilation Services Layout Level 02

DRAWN	CHECKED	SCALE
JA	JH	As indicated @ A1

DATE	DRAWING No	REV
08-09-2025	SPS-ABE-XX-L02-DR-P-57-0003	P01

a-b engineering
Holly Terrace • 9-17 Derby Lane
Old Swan • Liverpool • L13 6QA
T: 0151 228 4661 • F: 0151 220 4206
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website: www.abeng.co.uk

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2 03-08 - Ventilation Services Layout

1 : 100

Air Extract Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_125-CircularAirValve-Exhaust	03	1	16.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	03	3	8.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	03	1	13.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	03	38	16.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	03	1	20.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	03	13	21.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	03	13	26.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	03	7	34.0 L/s

Grand total: 77

Air Supply Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_150-CircularAirValve-Supply	03	1	13.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	03	3	16.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	03	7	17.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	03	6	18.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	03	7	19.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	03	6	23.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	03	3	33.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	03	10	34.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	03	6	38.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	03	7	42.0 L/s

Grand total: 56

MVHR Schedule

Family	Type	Equipment Reference	Level	Count
vent-axia_lo-carbonsentinelkineticplus	Right Hand	MVHR 01	03	15
vent-axia_lo-carbonsentinelkineticplus	Left Hand	MVHR 02	03	6

Grand total: 21

HWC Schedule

Type	Equipment Reference	Count
Modutherm - Juniper HP Plus - 200L	HWC 01	9
Modutherm - Juniper HP Plus - 300L	HWC 02	12

Grand total: 21

Apartment Ceiling Heights - Duct Heights

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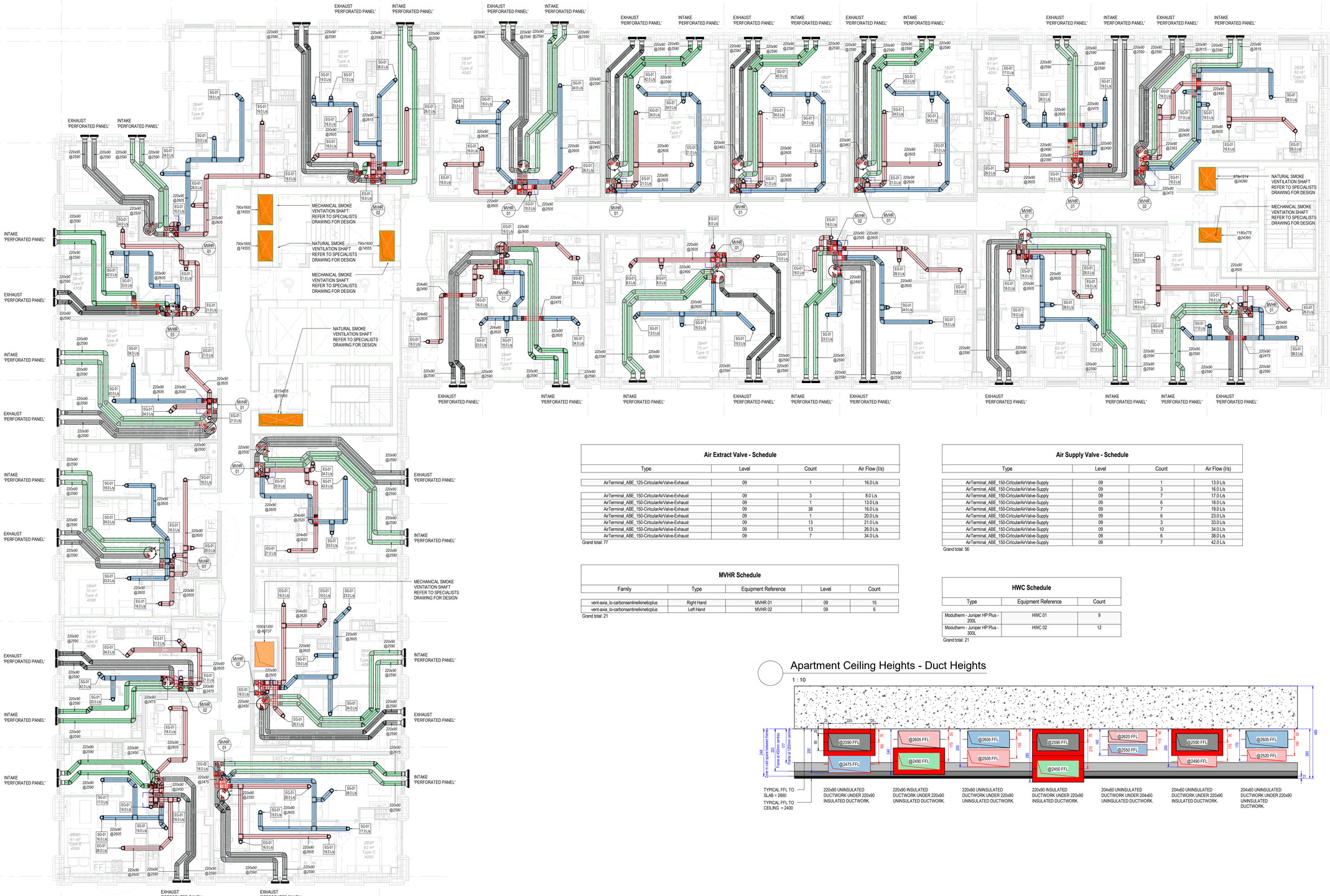
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DRAWN	CHECKED	SCALE
JA	JH	As indicated @ A1

DATE	DRAWING No	REV
08-09-2025	SPS-ABE-XX-ZZ-DR-P-57-0004	P01

a-b engineering
Holly Terrace ▪ 9-17 Derby Lane
Old Swan ▪ Liverpool ▪ L13 6QA
T: 0151 228 4661 ▪ F: 0151 220 4206
email: info@abeng.co.uk
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2 09 - Ventilation Services Layout

1 : 100

Air Extract Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_125-CircularAirValve-Exhaust	09	1	16.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	09	3	8.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	09	1	13.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	09	38	16.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	09	1	20.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	09	13	21.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	09	13	26.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	09	7	34.0 L/s

Grand total: 77

Air Supply Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_150-CircularAirValve-Supply	09	1	13.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	09	3	16.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	09	7	17.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	09	6	18.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	09	7	19.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	09	6	23.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	09	3	33.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	09	10	34.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	09	6	38.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	09	7	42.0 L/s

Grand total: 56

MVHR Schedule

Family	Type	Equipment Reference	Level	Count
vent-axia_lo-carbonsentinelkineticplus	Right Hand	MVHR 01	09	15
vent-axia_lo-carbonsentinelkineticplus	Left Hand	MVHR 02	09	6

Grand total: 21

HWC Schedule

Type	Equipment Reference	Count
Modutherm - Juniper HP Plus - 200L	HWC 01	9
Modutherm - Juniper HP Plus - 300L	HWC 02	12

Grand total: 21

Apartment Ceiling Heights - Duct Heights

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REVISION	ITEM REVISED	DATE
P01	Work In Progress - Showing Proposed Ductwork Routes Only	24.10.2024

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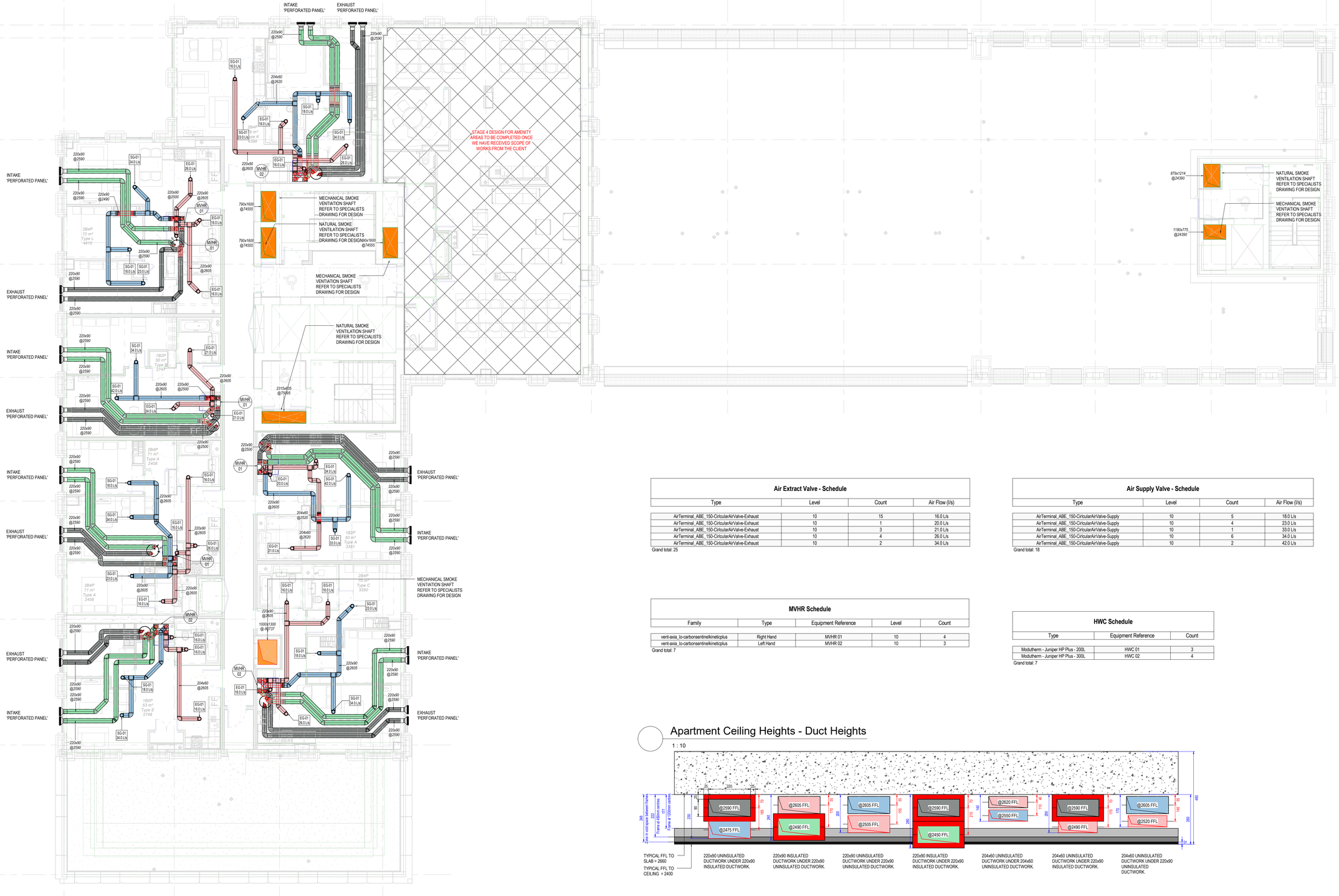
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JA	JH	As indicated @ A1

DATE	DRAWING No	REV
08-09-2025	SPS-ABE-XX-L09-DR-P-57-0005	P01

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Holly Terrace • 9-17 Derby Lane
Old Swan • Liverpool • L13 6QA
T: 0151 228 4661 • F: 0151 220 4206
email: info@abeng.co.uk
website: www.abeng.co.uk

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Air Extract Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_150-CircularAirValve-Exhaust	10	15	16.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	10	1	20.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	10	3	21.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	10	4	26.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	10	2	34.0 L/s

Grand total: 25

Air Supply Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_150-CircularAirValve-Supply	10	5	18.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	10	4	23.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	10	1	33.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	10	6	34.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	10	2	42.0 L/s

Grand total: 18

MVHR Schedule

Family	Type	Equipment Reference	Level	Count
vent-axia_lo-carbonsentinelkineticplus	Right Hand	MVHR 01	10	4
vent-axia_lo-carbonsentinelkineticplus	Left Hand	MVHR 02	10	3

Grand total: 7

HWC Schedule

Type	Equipment Reference	Count
Modutherm - Juniper HP Plus - 200L	HWC 01	3
Modutherm - Juniper HP Plus - 300L	HWC 02	4

Grand total: 7

2 10 - Ventilation Services Layout

1 : 100

Apartment Ceiling Heights - Duct Heights

1 : 10

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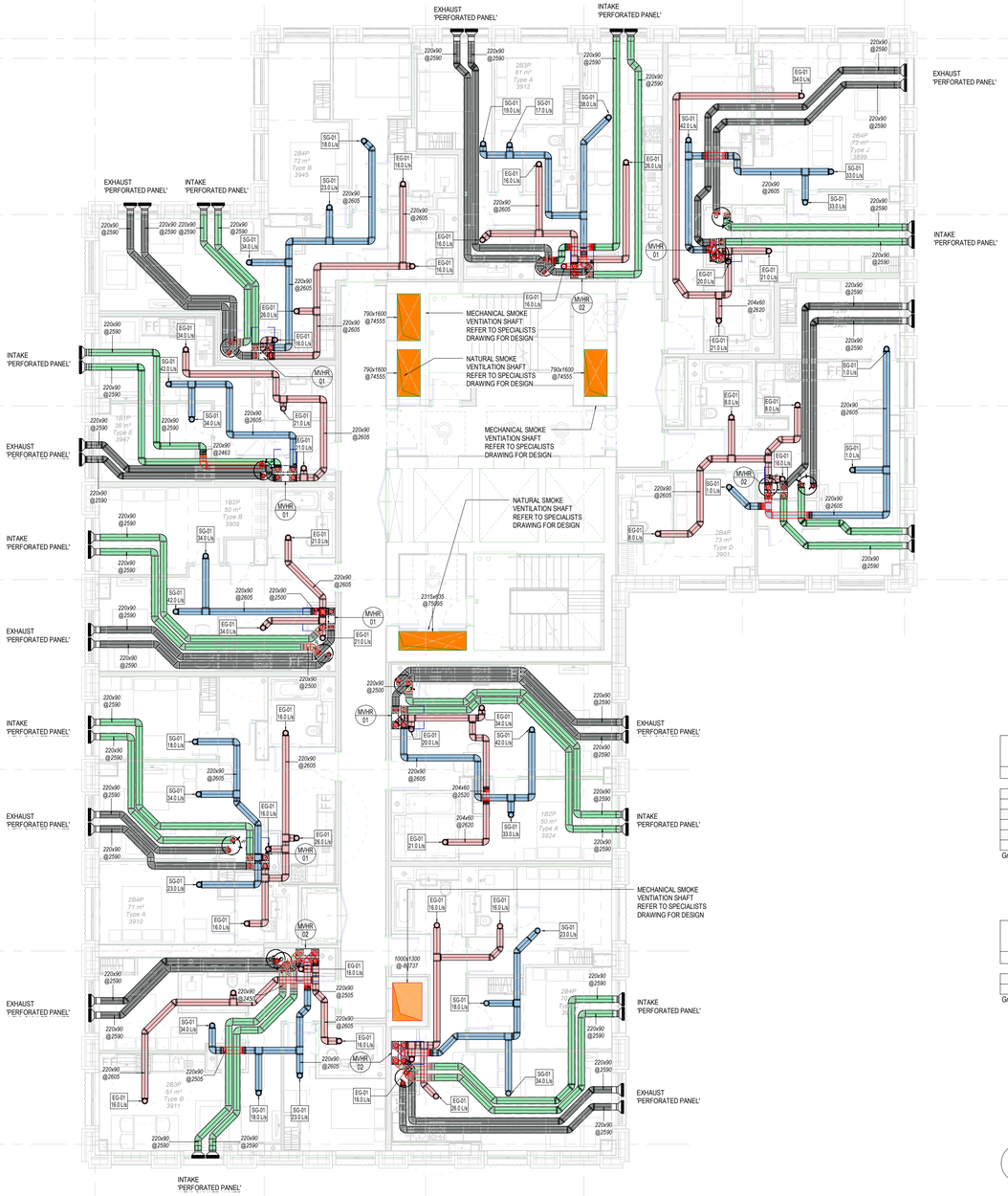
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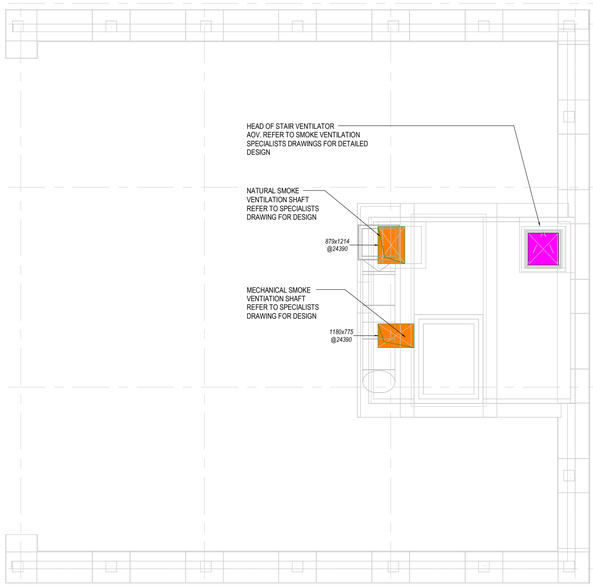
a+b engineering
Holly Terrace ▪ 9-17 Derby Lane
Old Swan ▪ Liverpool ▪ L13 6QA
T: 0151 228 4661 ▪ F: 0151 220 4206
email: info@abeng.co.uk
website: www.abeng.co.uk

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2 11-24 - Ventilation Services Layout

1 : 100



Air Extract Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_150-CircularAirValve-Exhaust	11	3	8.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	11	16	16.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	11	2	20.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	11	7	21.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	11	5	26.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	11	4	34.0 L/s

Grand total: 37

Air Supply Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_150-CircularAirValve-Supply	11	3	1.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	11	1	17.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	11	4	18.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	11	1	19.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	11	4	23.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	11	3	33.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	11	6	34.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	11	1	38.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	11	4	42.0 L/s

Grand total: 27

MVHR Schedule

Family	Type	Equipment Reference	Level	Count
vent-axia_lo-carbonsentinelkineticplus	Right Hand	MVHR 01	11	6
vent-axia_lo-carbonsentinelkineticplus	Left Hand	MVHR 02	11	4

Grand total: 10

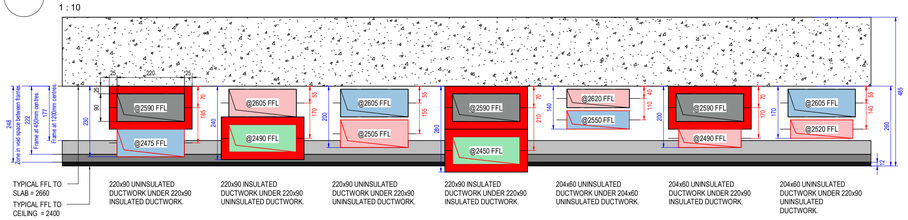
HWC Schedule

Type	Equipment Reference	Count
Modutherm - Juniper HP Plus - 200L	HWC 01	6
Modutherm - Juniper HP Plus - 300L	HWC 02	7

Grand total: 13

Apartment Ceiling Heights - Duct Heights

1 : 10



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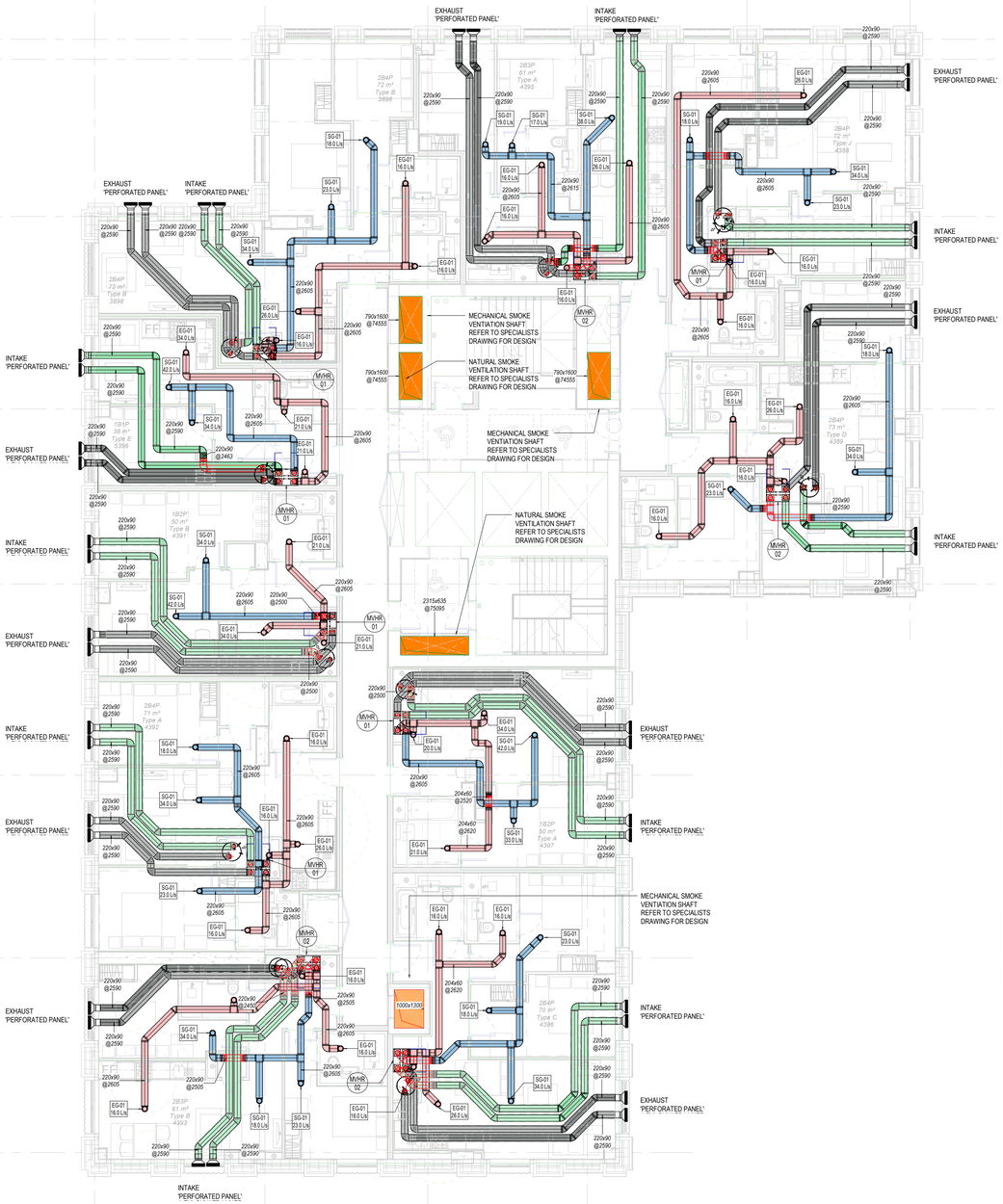
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JA	JH	As indicated @ A1

DATE	DRAWING No	REV
08-09-2025	SPS-ABE-XX-ZZ-DR-P-57-0007	P01

a-b engineering
Holly Terrace • 9-17 Derby Lane
Old Swan • Liverpool • L13 6QA
T: 0151 228 4661 • F: 0151 220 4206
email: info@abeng.co.uk
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2 25 - Ventilation Services Layout

1 : 100

Air Extract Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_150-CircularAirValve-Exhaust	25	21	16.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	25	1	20.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	25	5	21.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	25	7	26.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	25	3	34.0 L/s

Grand total: 37

Air Supply Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_150-CircularAirValve-Supply	25	1	17.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	25	6	18.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	25	1	19.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	25	6	23.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	25	1	33.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	25	8	34.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	25	1	38.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	25	3	42.0 L/s

Grand total: 27

MVHR Schedule

Family	Type	Equipment Reference	Level	Count
vent-axia_lo-carbonsentinelkinetic plus	Right Hand	MVHR 01	25	6
vent-axia_lo-carbonsentinelkinetic plus	Left Hand	MVHR 02	25	4

Grand total: 10

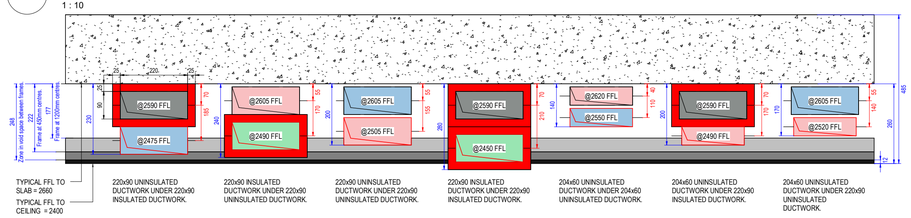
HWC Schedule

Type	Equipment Reference	Count
Modutherm - Juniper HP Plus - 200L	HWC 01	6
Modutherm - Juniper HP Plus - 300L	HWC 02	7

Grand total: 13

Apartment Ceiling Heights - Duct Heights

1 : 10



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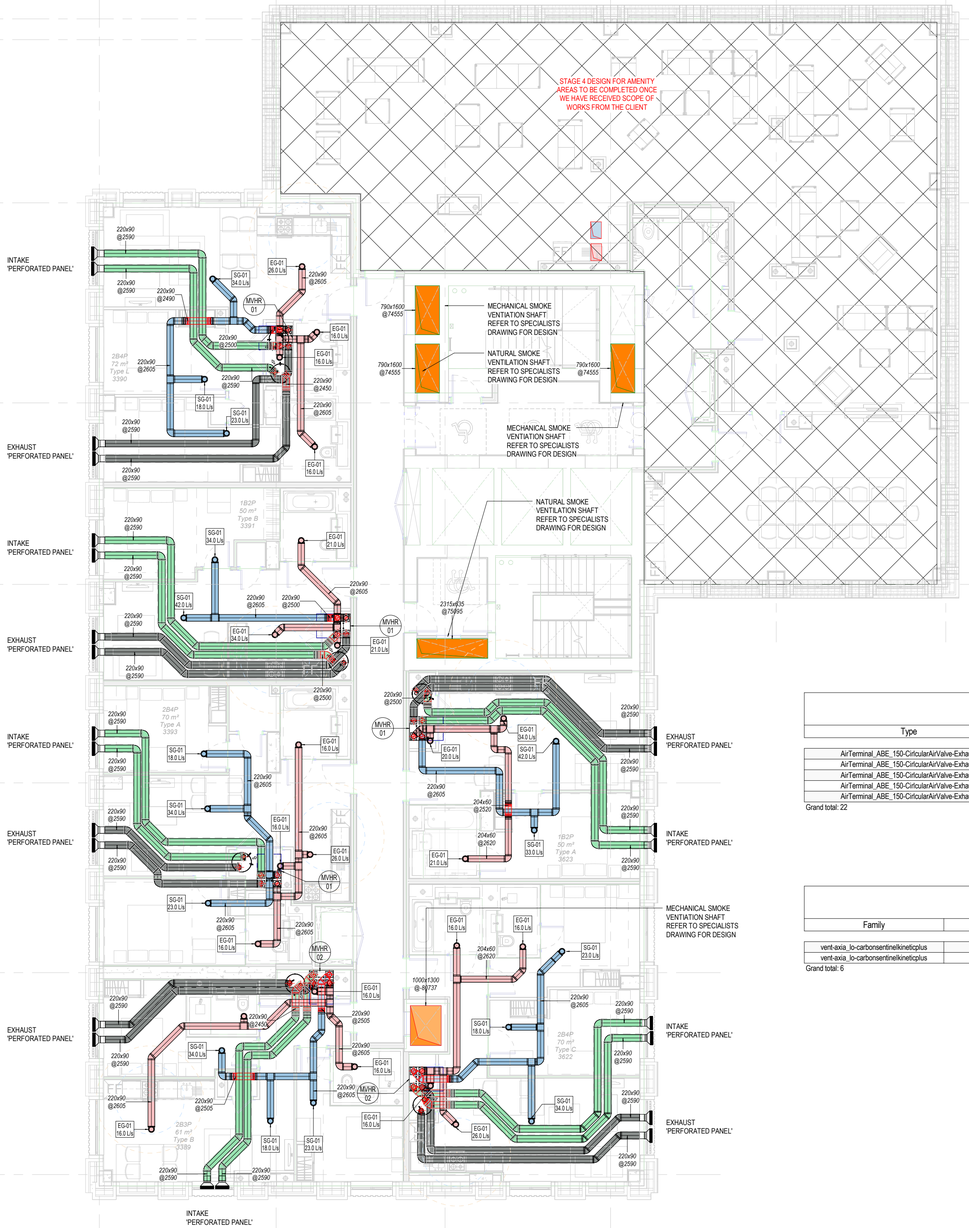
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DRAWN	CHECKED	SCALE
JA	JH	As indicated @ A1

DATE	DRAWING No	REV
08-09-2025	SPS-ABE-XX-L25-DR-P-57-0008	P01

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T: 0151 228 4661 • F: 0151 220 4206
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2 26 - Ventilation Services Layout

1 : 100

Air Extract Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_150-CircularAirValve-Exhaust	26	12	16.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	26	1	20.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	26	3	21.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	26	4	25.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	26	2	34.0 L/s

Grand total: 22

Air Supply Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_150-CircularAirValve-Supply	26	4	18.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	26	4	23.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	26	1	33.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	26	5	34.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	26	2	42.0 L/s

Grand total: 16

MVHR Schedule

Family	Type	Equipment Reference	Level	Count
vent-axia_lo-carbonsentinelkineticplus	Right Hand	MVHR 01	26	4
vent-axia_lo-carbonsentinelkineticplus	Left Hand	MVHR 02	26	2

Grand total: 6

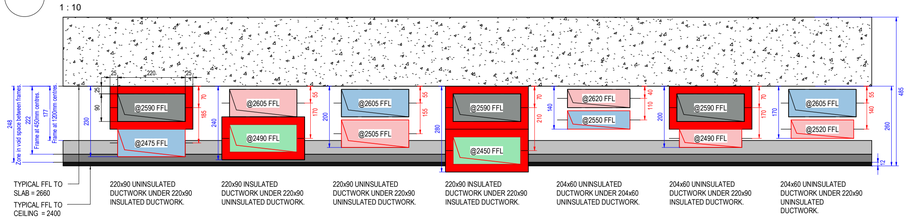
HWC Schedule

Type	Equipment Reference	Count
Modutherm - Juniper HP Plus - 200L	HWC 01	4
Modutherm - Juniper HP Plus - 300L	HWC 02	4

Grand total: 8

Apartment Ceiling Heights - Duct Heights

1 : 10



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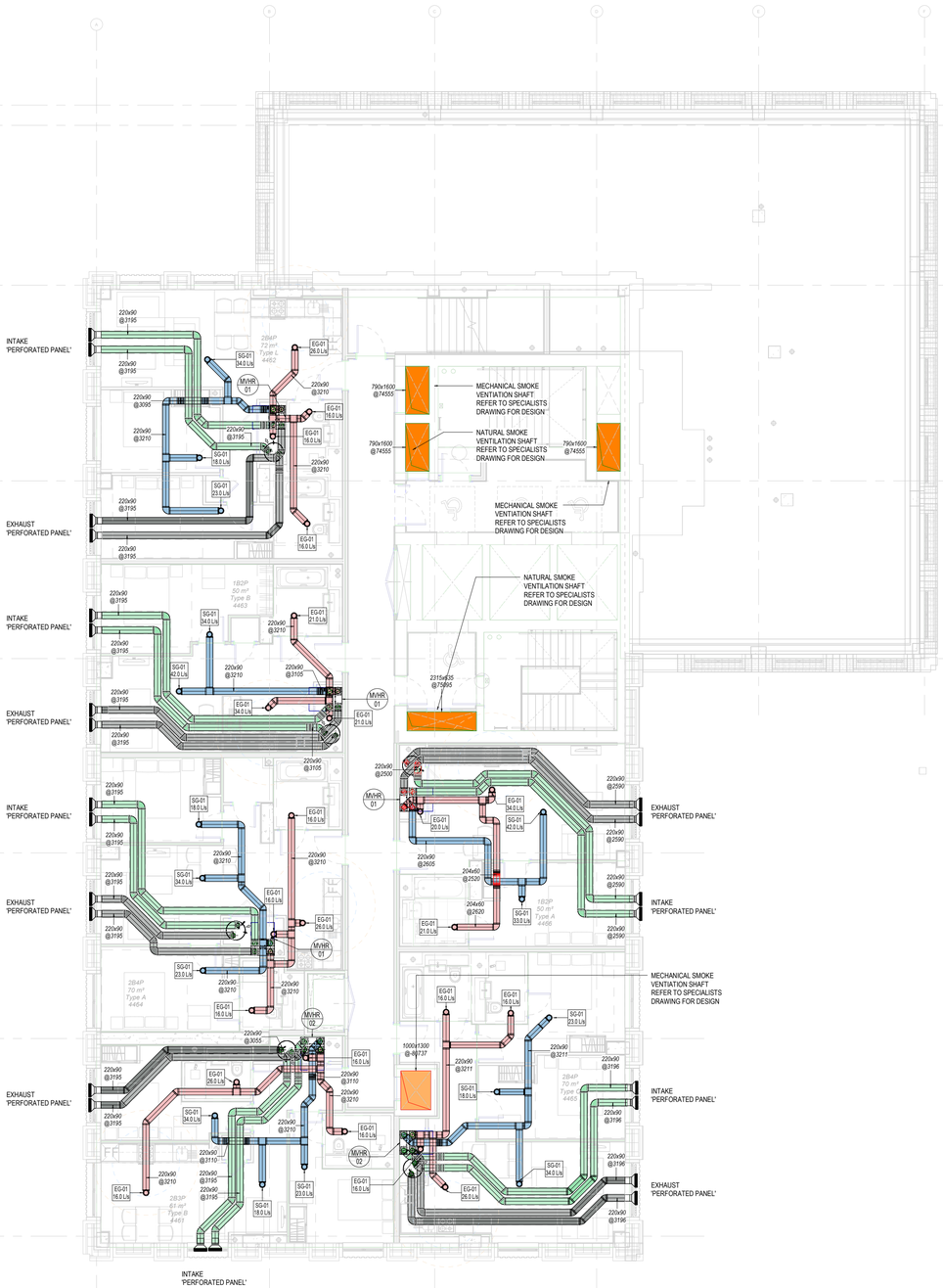
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DRAWN	CHECKED	SCALE
JA	JH	As indicated @ A1

DATE	DRAWING No	REV
08-09-2025	SPS-ABE-XX-L26-DR-P-57-0009	P01

a-b engineering
Holly Terrace • 9-17 Derby Lane
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T: 0151 228 4661 • F: 0151 220 4206
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2 27 - Ventilation Services Layout
1 : 100

Air Extract Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_150-CircularAirValve-Exhaust	27	12	16.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	27	1	20.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	27	3	21.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	27	4	26.0 L/s
AirTerminal_ABE_150-CircularAirValve-Exhaust	27	2	34.0 L/s

Grand total: 22

Air Supply Valve - Schedule

Type	Level	Count	Air Flow (l/s)
AirTerminal_ABE_150-CircularAirValve-Supply	27	4	18.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	27	4	23.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	27	1	33.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	27	5	34.0 L/s
AirTerminal_ABE_150-CircularAirValve-Supply	27	2	42.0 L/s

Grand total: 16

MVHR Schedule

Family	Type	Equipment Reference	Level	Count
vent-axia_lo-carbonsentinelkineticplus	Right Hand	MVHR 01	27	4
vent-axia_lo-carbonsentinelkineticplus	Left Hand	MVHR 02	27	2

Grand total: 6

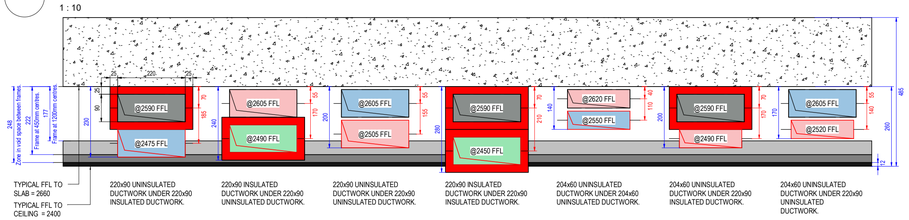
HWC Schedule

Type	Equipment Reference	Count
Modutherm - Juniper HP Plus - 200L	HWC 01	3
Modutherm - Juniper HP Plus - 300L	HWC 02	3

Grand total: 6

Apartment Ceiling Heights - Duct Heights

1 : 10



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TITLE
Ventilation Services Layout Level 27

DRAWN	CHECKED	SCALE
JA	JH	As indicated @ A1

DATE	DRAWING No	REV
08-09-2025	SPS-ABE-XX-L27-DR-P-57-0010	P01

a-b engineering
Holly Terrace ▪ 9-17 Derby Lane
Old Swan ▪ Liverpool ▪ L13 6QA
T: 0151 228 4661 ▪ F: 0151 220 4206
email: info@abeng.co.uk
website: www.abeng.co.uk

Appendix 2 Survey Results

Survey Summary:

The survey comprised short-term operator attended noise and vibration measurements and longer-term unattended noise monitoring at the site. Noise levels at the site were generally dictated by road traffic on surrounding roads. Vibration levels at the site were very low.

Survey Period:

02/05/2023 to 10/05/2023

Survey Objectives:

- To identify noise and vibration sources that contribute to ambient noise levels at the site;
- To measure noise and vibration levels around the site over a typical day and night-time period.

Equipment Used:

Type	Manufacturer	Model	Serial Number
Sound level meter[1] (noise logger)	Rion	NL-32	01182950
Sound level meter[1] (noise logger)	Rion	NL-32	00903342
Calibrator	Rion	NC-74	34551703
Sound level meter[1]	Rion	NL-52	00965090
Accelerometer	Rion	PV-57A	50472
4 Channel Data Logger	Rion	DA-21	00360369
Accelerometer (attached to DA-20)	Rion	PV-57I	53045 (X axis)
Accelerometer (attached to DA-20)	Rion	PV-57I	53046 (Y axis)
Accelerometer (attached to DA-20)	Rion	PV-57I	53105 (Z axis)
Tri-Axial Vibration Meter	Rion	XV-2P	00380055
Tri-axial accelerometer	Rion	PV-83C	73649

Note 1: All sound level meters were calibrated before and after measurement periods and no significant drift in calibration was found to have occurred. The results of the measurements are therefore considered to be representative.

Weather Conditions:

The observed weather conditions were acceptable for acoustic measurement throughout the attended survey periods (low-medium wind speeds and no rain). Weather records for the area confirmed that weather conditions were also generally acceptable for acoustic measurement during the unattended monitoring.

Measurement Positions:

Position (refer plan below)	Description
N1	Attended noise monitoring position. 1.5m above roof level, approx. 12m above ground. Free-field. Direct line of sight to railway station and tracks.
N2	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to Store Street.
L1	Unattended noise logging position. 2m above ground level. Free-field. Direct line of sight to Store Street.
L2	Unattended noise logging position. 3m above ground level of Sparkle Street (site sits 2m below ground level of Sparkle Street). Free-field. Direct line of sight to Sparkle Street.
V1	Unattended ground-borne vibration monitoring position. The vibration measurements were taken on top of the existing concrete foundations.
V2	

Site Plan showing Measurement Positions:



Attended Noise Monitoring Results:

Date	Position	Time	Meas. Length	LAeq, dB	LAmax, dB	LA90, dB	Observations
02/05/2023	N1	16:59	25 secs	58	61	57	Noise dictated by distant train arriving and announcements.
		17:00	5 mins	55	62	51	Noise dictated by distant trains arriving, leaving, idle engines in the station, announcements, tonal
		17:05		53	60	52	

Attended Noise Monitoring Results:

Date	Position	Time	Meas. Length	LAeq, dB	LAmax, dB	LA90, dB	Observations
		17:10		56	61	53	plant, breaks squeaking when train approaches the station. Female announcement quieter than male.
	N2	17:20		66	80	57	Noise dictated by road traffic on Store Street.
		17:25	9 secs	71	75	62	
		17:25	7 secs	71	74	68	
		17:25	12 secs	63	73	55	

Unattended Noise Monitoring Results:

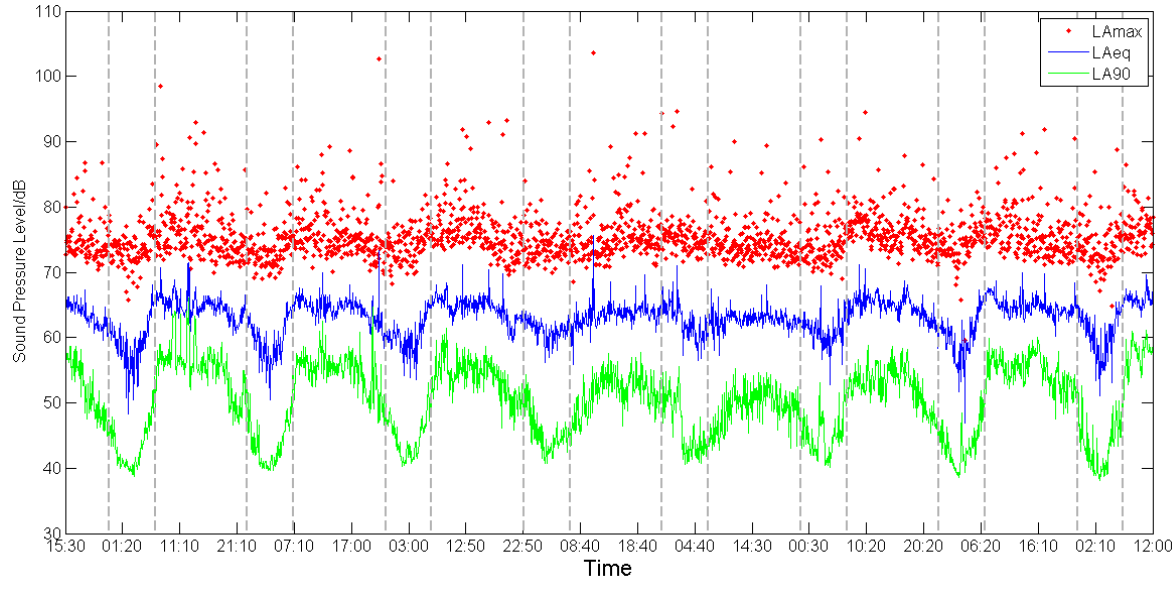
Meas. Period	Position	Daytime (0700-2300hrs)		Night-time (2300-0700hrs)		
		LAeq,16hr, dB	LA90,1hr dB[1]	LAeq,8hr, dB	LA90,5mins, dB[1]	LAmax, dB[2]
02/05/2023 to 10/05/2023	L1	65	54	62	42	78
02/05/2023 to 03/05/2023	L2	57	51	52	42	72

Note 1: Typical lowest measured during the period shown.

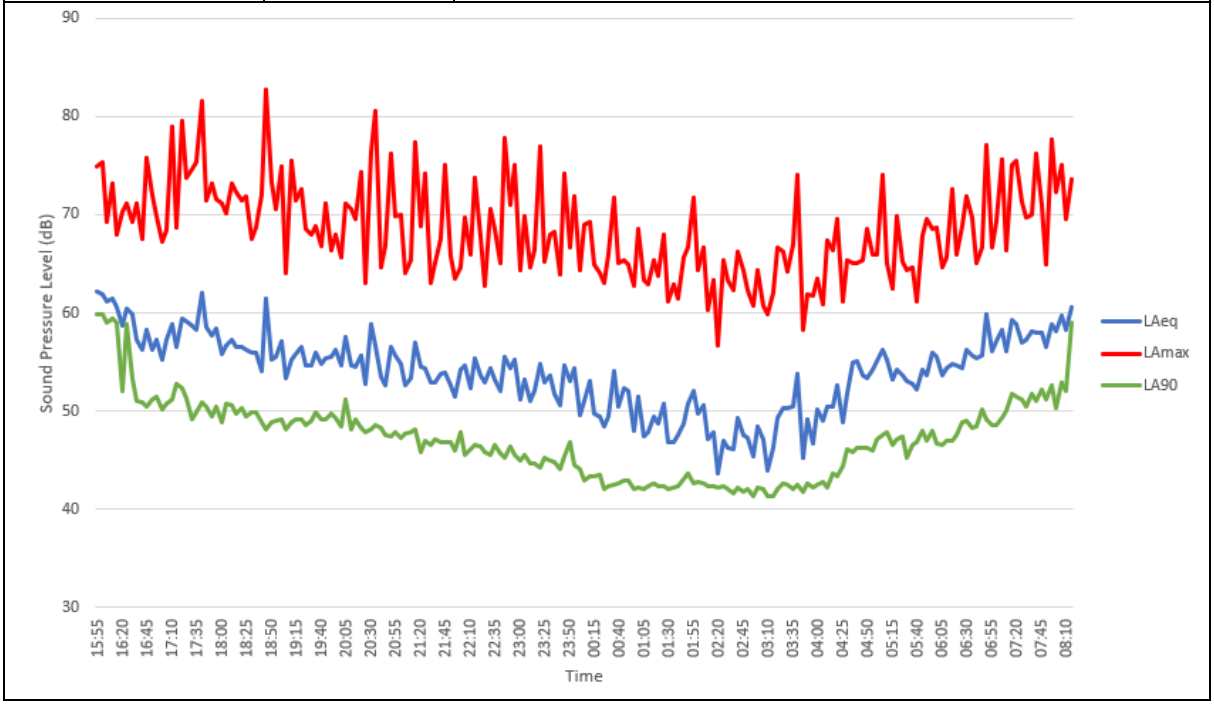
Note 2: Highest typical maximum noise level during the night-time (not exceeded more than 10-15 times per night).

Unattended Noise Monitoring Results:

Meas. Period	Position	Store Street
02/05/2023 to 10/05/2023	L1	



Meas. Period	Position	Sparkle Street
02/05/2023 to 03/05/2023	L2	



Unattended Ground-borne Vibration Monitoring Results:

Date	Position	Time	Meas. Length	X VDV	Y VDV	Z VDV
02/05/2023	V1	16:50:02	10 secs	0.00014	0.00017	0.00079
		16:50:12		0.00020	0.00023	0.00068
		16:50:22		0.00020	0.00022	0.00082
		16:50:32		0.00019	0.00024	0.00070
		16:50:42		0.00019	0.00020	0.00098
		16:50:52		0.00016	0.00016	0.00084
		16:51:02		0.00061	0.00068	0.00065
		16:51:12		0.00017	0.00015	0.00068
		16:51:22		0.00022	0.00020	0.00067
		16:51:32		0.00019	0.00018	0.00081
		16:51:42		0.00018	0.00021	0.00068
		16:51:52		0.00011	0.00012	0.00091
		16:52:02		0.00014	0.00016	0.00078
		16:52:12		0.00013	0.00012	0.00073
		16:52:22		0.00020	0.00017	0.00067
		16:52:32		0.00015	0.00018	0.00066
		16:52:42		0.00016	0.00015	0.00061
		16:52:52		0.00028	0.00028	0.00145

Date	Position	Time	Meas. Length	X VDV	Y VDV	Z VDV
		16:53:02		0.00023	0.00022	0.00109
		16:53:12		0.00015	0.00013	0.00073
		16:53:22		0.00018	0.00022	0.00056
		16:53:32		0.00012	0.00016	0.00073
		16:53:42		0.00015	0.00014	0.00077
		16:53:52		0.00036	0.00037	0.00068
		16:54:02		0.00047	0.00048	0.00087
		16:54:12		0.00018	0.00019	0.00082
		16:54:22		0.00019	0.00021	0.00070
		16:54:32		0.00024	0.00025	0.00074
		16:54:42		0.00028	0.00032	0.00074
		16:54:52		0.00020	0.00020	0.00065
		16:55:02		0.00019	0.00020	0.00074
		16:55:12		0.00015	0.00012	0.00050
		16:55:22		0.00015	0.00015	0.00068
		16:55:32		0.00020	0.00024	0.00068
		16:55:42		0.00020	0.00020	0.00077
		16:55:52		0.00019	0.00021	0.00076
		16:56:02		0.00023	0.00024	0.00094
		16:56:12		0.00020	0.00021	0.00068
		16:56:22		0.00020	0.00019	0.00054
		16:56:32		0.00017	0.00017	0.00063
		16:56:42		0.00018	0.00019	0.00058
		16:56:52		0.00019	0.00019	0.00048
		16:57:02		0.00037	0.00032	0.00058
		16:57:12		0.00018	0.00018	0.00063
		16:57:22		0.00017	0.00016	0.00044
		16:57:32		0.00016	0.00013	0.00073
		16:57:42		0.00015	0.00014	0.00056
		16:57:52		0.00017	0.00015	0.00063
		16:58:02		0.00014	0.00014	0.00067
		16:58:12		0.00015	0.00015	0.00086
		16:58:22		0.00017	0.00022	0.00079
		16:58:32		0.00021	0.00022	0.00101
		16:58:42		0.00020	0.00021	0.00086
		16:58:52		0.00047	0.00041	0.00075

Date	Position	Time	Meas. Length	X VDV	Y VDV	Z VDV
		16:59:02		0.00033	0.00032	0.00114
		16:59:12		0.00024	0.00023	0.00150
		16:59:22		0.00027	0.00027	0.00102
		16:59:32		0.00014	0.00021	0.00129
		16:59:42		0.00024	0.00025	0.00066
		16:59:52		0.00023	0.00023	0.00067
		17:00:02		0.00026	0.00026	0.00058
		17:00:12		0.00010	0.00011	0.00058
		17:00:22		0.00019	0.00018	0.00082
		17:00:32		0.00011	0.00010	0.00066
		17:00:42		0.00017	0.00014	0.00057
		17:00:52		0.00016	0.00015	0.00049
		17:01:02		0.00026	0.00026	0.00062
		17:01:12		0.00019	0.00016	0.00126
		17:01:22		0.00022	0.00019	0.00083
		17:01:32		0.00019	0.00020	0.00094
		17:01:42		0.00017	0.00017	0.00082
		17:01:52		0.00022	0.00021	0.00084
		17:02:02		0.00028	0.00027	0.00126
		17:02:12		0.00016	0.00018	0.00172
		17:02:22		0.00020	0.00019	0.00066
		17:02:32		0.00016	0.00022	0.00042
		17:02:42		0.00011	0.00012	0.00040
		17:02:52		0.00020	0.00018	0.00055
		17:03:02		0.00012	0.00015	0.00087
		17:03:12		0.00027	0.00026	0.00081
		17:03:22		0.00019	0.00022	0.00097
		17:03:32		0.00017	0.00020	0.00093
		17:03:42		0.00065	0.00062	0.00078
		17:03:52		0.00020	0.00019	0.00057
		17:04:02		0.00022	0.00017	0.00081
		17:04:12		0.00021	0.00022	0.00088
		17:04:22		0.00019	0.00021	0.00079
		17:04:32		0.00021	0.00023	0.00066
		17:04:42		0.00022	0.00018	0.00072
		17:04:52		0.00014	0.00011	0.00043

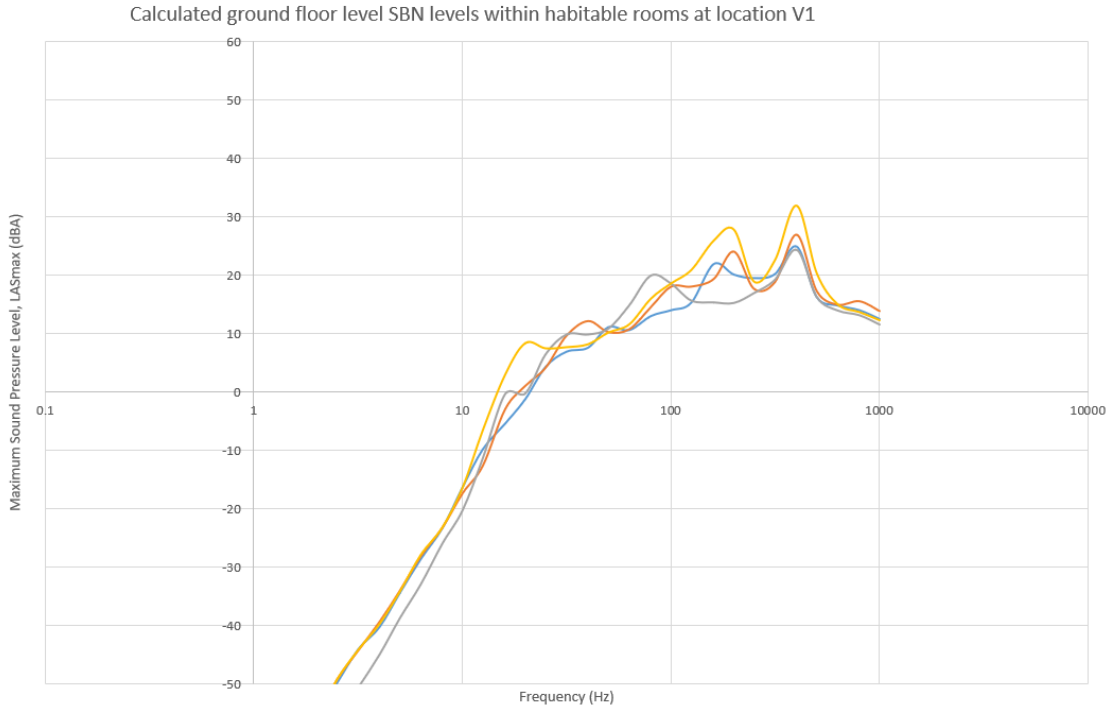
Date	Position	Time	Meas. Length	X VDV	Y VDV	Z VDV
		17:05:02		0.00016	0.00017	0.00066
		17:05:12		0.00019	0.00022	0.00072
		17:05:22		0.00027	0.00027	0.00069
		17:05:32		0.00022	0.00021	0.00056
		17:05:42		0.00019	0.00017	0.00057
		17:05:52		0.00021	0.00023	0.00068
		17:06:02		0.00018	0.00020	0.00065
		17:06:12		0.00030	0.00029	0.00063
		17:06:22		0.00042	0.00045	0.00080
		17:06:32		0.00021	0.00020	0.00115
		17:06:42		0.00020	0.00024	0.00085
		17:06:52		0.00021	0.00025	0.00057
		17:07:02		0.00021	0.00024	0.00095
		17:07:12		0.00018	0.00024	0.00087
		17:07:22		0.00086	0.00085	0.00083
		17:07:32		0.00018	0.00021	0.00111
		17:07:42		0.00020	0.00018	0.00149
		17:07:52		0.00016	0.00018	0.00122
		17:08:02		0.00019	0.00018	0.00116
		17:08:12		0.00017	0.00018	0.00118
		17:08:22		0.00021	0.00024	0.00122
		17:08:32		0.00059	0.00054	0.00077
		17:08:42		0.00054	0.00057	0.00054
		17:08:52		0.00013	0.00010	0.00066
		17:09:02		0.00010	0.00010	0.00074
		17:09:12		0.00020	0.00021	0.00136
		17:09:22		0.00022	0.00020	0.00083
		17:09:32		0.00020	0.00020	0.00076
		17:09:42		0.00015	0.00013	0.00092
		17:09:52		0.00021	0.00021	0.00102
		17:10:02		0.00018	0.00021	0.00069
		17:10:12		0.00031	0.00031	0.00068
		17:10:22		0.00066	0.00063	0.00101
		17:10:32		0.00020	0.00021	0.00080
		17:10:42		0.00021	0.00019	0.00089
		17:10:52		0.00016	0.00019	0.00069

Date	Position	Time	Meas. Length	X VDV	Y VDV	Z VDV
		17:11:02		0.00011	0.00013	0.00080
		17:11:12		0.00014	0.00018	0.00080
		17:11:22		0.00018	0.00018	0.00070
		17:11:32		0.00028	0.00028	0.00091
		17:11:42		0.00020	0.00018	0.00088
		17:11:52		0.00017	0.00021	0.00074
		17:12:02		0.00015	0.00017	0.00073
		17:12:12		0.00021	0.00018	0.00069
		17:12:22		0.00019	0.00017	0.00070
		17:12:32		0.00018	0.00020	0.00248
		17:12:42		0.00015	0.00016	0.00059
		17:12:52		0.00025	0.00023	0.00076
		17:13:02		0.00020	0.00020	0.00060
		17:13:12		0.00011	0.00012	0.00082
		17:13:22		0.00019	0.00023	0.00221
		17:13:32		0.00016	0.00016	0.00088
		17:13:42		0.00010	0.00012	0.00067
		17:13:52		0.00013	0.00015	0.00066
		17:14:02		0.00012	0.00013	0.00072
		17:14:12		0.00018	0.00021	0.00066
		17:14:22		0.00019	0.00016	0.00056
		17:14:32		0.00018	0.00018	0.00049
		17:14:42		0.00053	0.00054	0.00054
		17:14:52		0.00020	0.00021	0.00112
		17:15:02		0.00018	0.00016	0.00068
		17:15:12		0.00020	0.00018	0.00073
		17:15:22		0.00018	0.00018	0.00065
		17:15:32		0.00018	0.00016	0.00060
		17:15:42		0.00023	0.00022	0.00068
		17:15:52		0.00022	0.00022	0.00069
		17:16:02		0.00012	0.00012	0.00074
		17:16:12		0.00017	0.00017	0.00118
		17:16:22		0.00024	0.00023	0.00092
		17:16:32		0.00021	0.00018	0.00088
		17:16:42		0.00020	0.00021	0.00059
		17:16:52		0.00022	0.00021	0.00100

Date	Position	Time	Meas. Length	X VDV	Y VDV	Z VDV
		17:17:02		0.00021	0.00023	0.00105
		17:17:12		0.00025	0.00024	0.00141
		17:17:22		0.00023	0.00023	0.00059
		17:17:32		0.00018	0.00021	0.00044
		17:17:42		0.00021	0.00022	0.00051
		17:17:52		0.00023	0.00024	0.00077
		17:18:02		0.00021	0.00025	0.00094
		17:18:12		0.00022	0.00021	0.00066
		17:18:22		0.00022	0.00023	0.00087
		17:18:32		0.00045	0.00045	0.00092
		17:18:42		0.00067	0.00070	0.00100
		17:18:52		0.00030	0.00032	0.00074
		17:19:02		0.00018	0.00020	0.00082
		17:19:12		0.00027	0.00025	0.00109
		17:19:22		0.00022	0.00020	0.00092
		17:19:32		0.00053	0.00051	0.00082
		17:19:42		0.00045	0.00042	0.00087
		17:19:52		0.00055	0.00059	0.00072

Note 1: Vibration measurements were taken across the low-frequency range (1-80Hz)

Attended Ground-borne Noise Calculation Results:

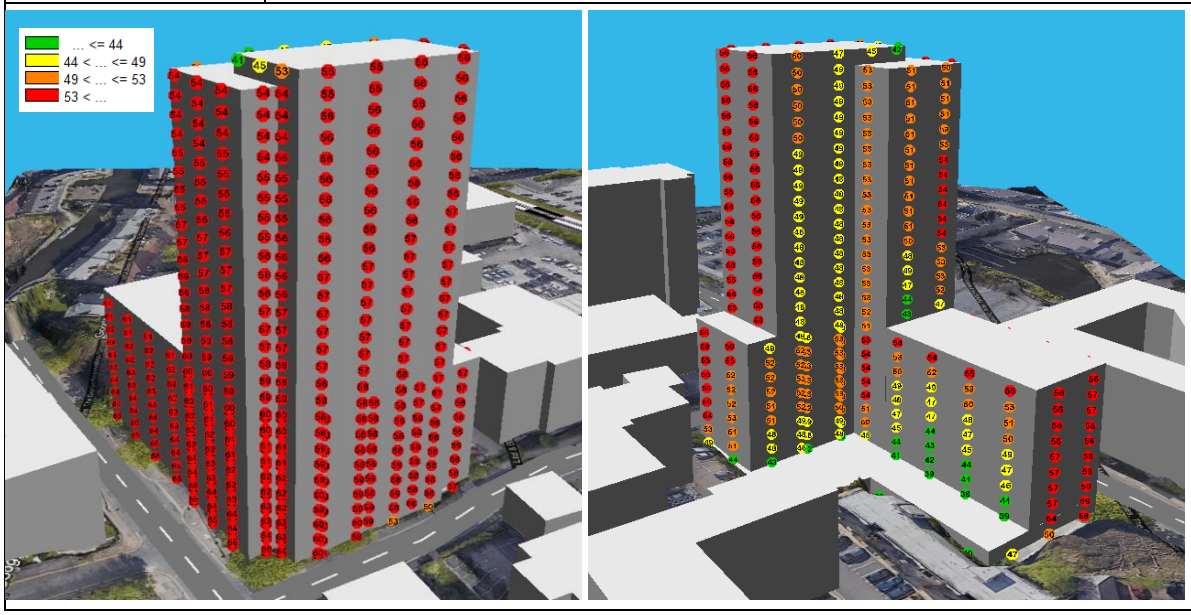


Appendix 3 Modelling Results

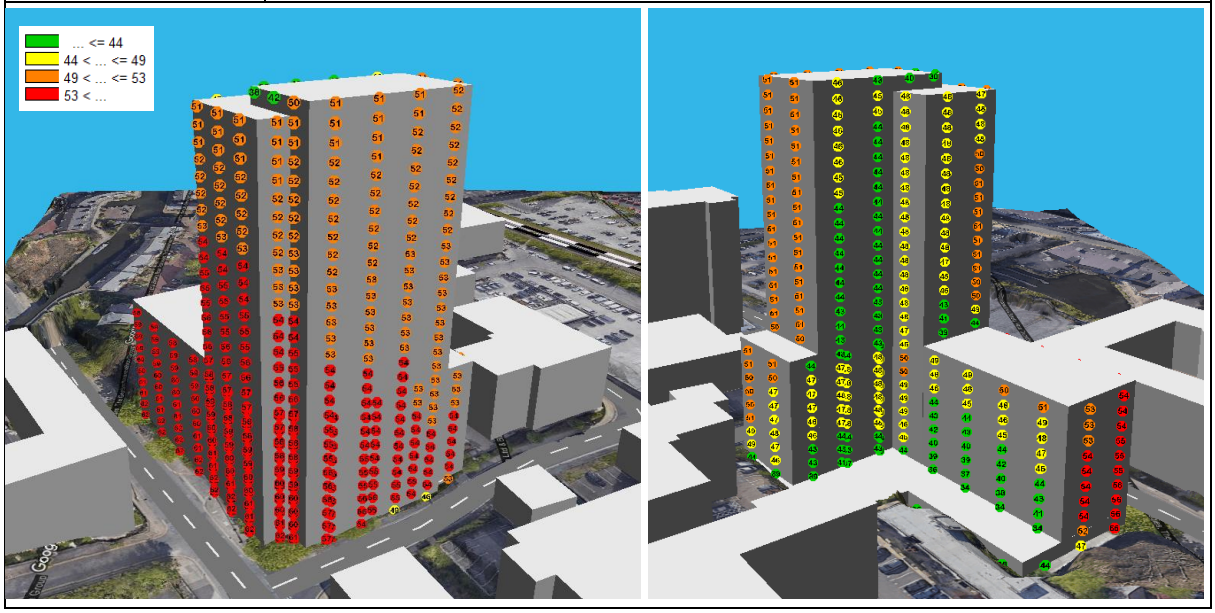
Modelling Software:	CADNA/A Version 2023
Modelled Scenarios:	• Day and night-time average noise levels across the site • Night-time maximum noise levels across the site
Data inputs:	• Noise survey results • Topographical data for the site • Development layout
Calculation Algorithms Used:	• Calculation of Road Traffic Noise 1988 – Department of Transport • ISO 9613-1:1993 Acoustics-Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere • ISO 9613-2:1996 Acoustics-Attenuation of sound during propagation outdoors – Part 2: General method of calculation

Modelling Printout:

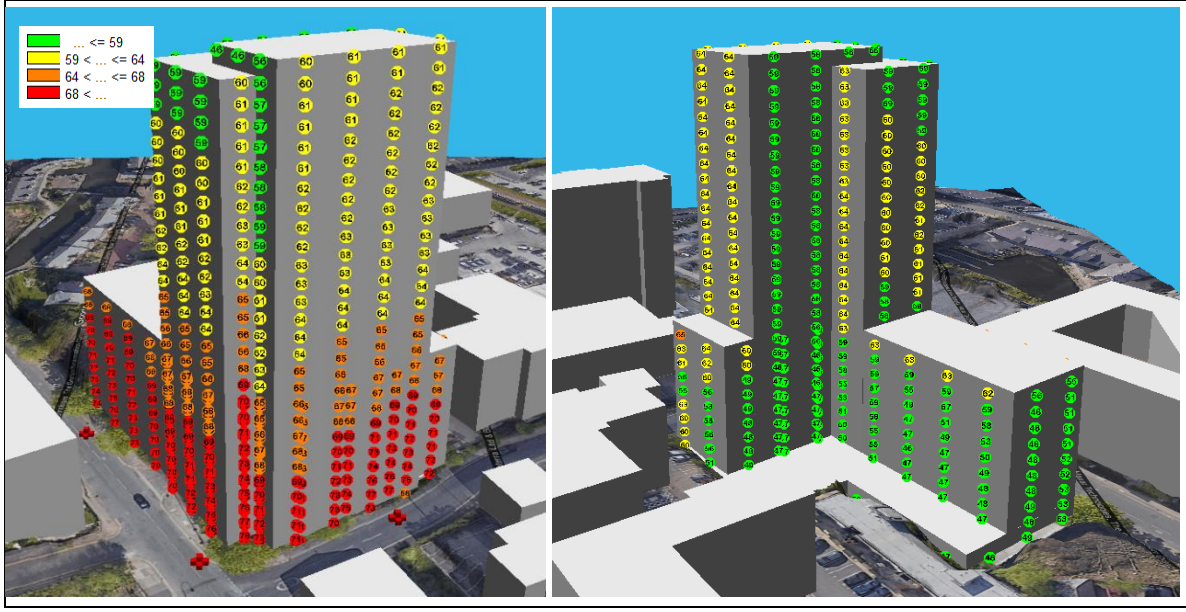
Scenario	Daytime average noise levels (LAeq,16hr) at 1.5m above ground level



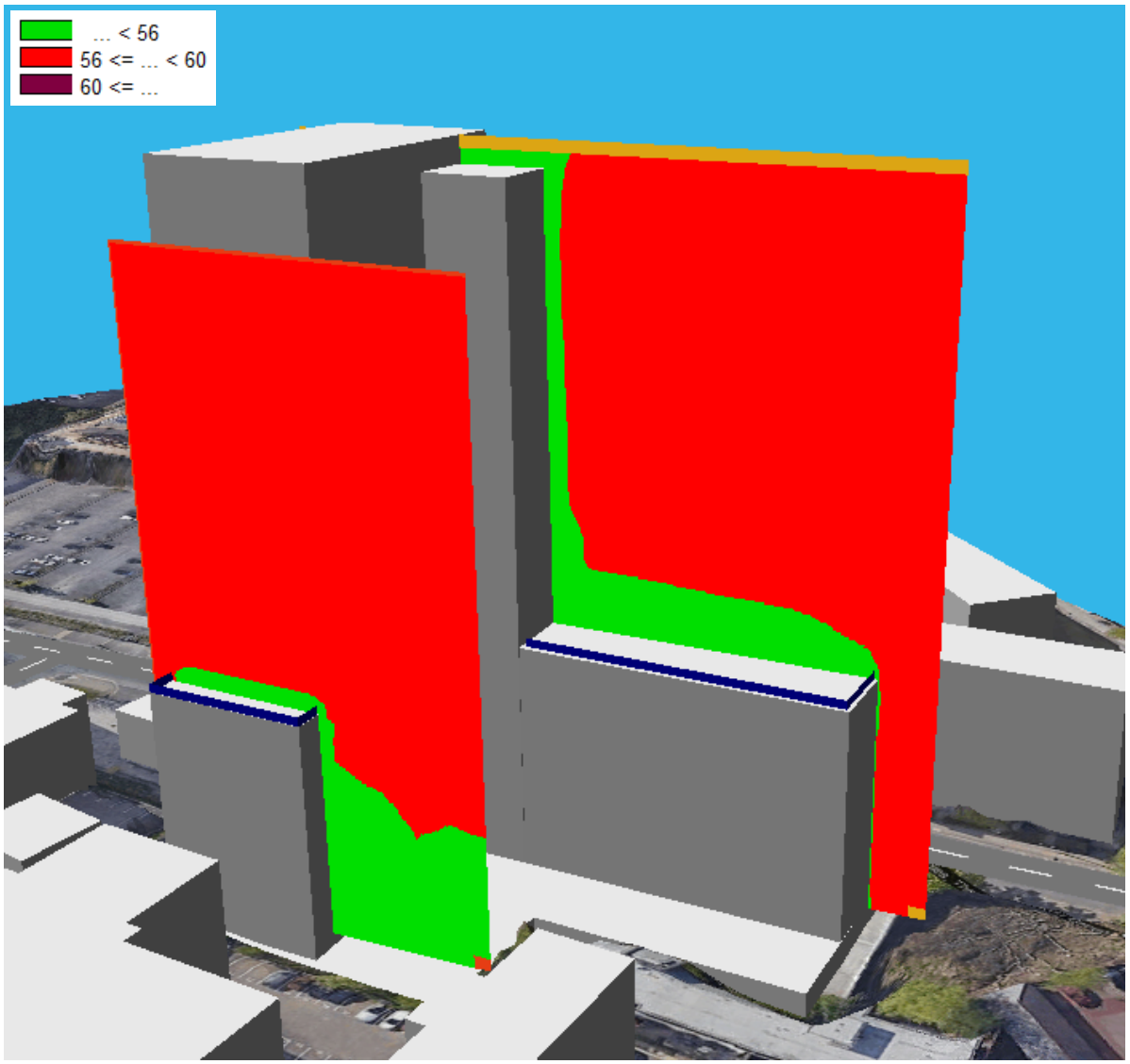
Scenario	Night-time average noise levels (LAeq,8hr) at 1.5m above ground level



Scenario	Night-time maximum noise levels (LAmax) at 1.5m above ground level



Scenario	Daytime average noise levels (LAeq,16hr) in external amenity areas



Appendix 4 Facade Calculations

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FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
CLIENT:	MIDGARD LTD	Room Dimensions [m]	2.7	X	3.0	X	2.6
PROJECT:	Sparkle Street, Manchester						
ROOM:	Bedroom (overlooking Sparkle Street)						
RUN REF:	23244						
VARIANT:	Daytime Average Noise Levels (LAeq,16hr)						

Room Volume =	21.1	m3		
Partition Area =	7.0	m2		
Ventilation ref area =	10.0	m2		
Free Field SPL K =	3	dB		

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	60.0								
		41.8	45.9	49.4	52.8	56.0	53.2	48.0	**Reference spectrum**

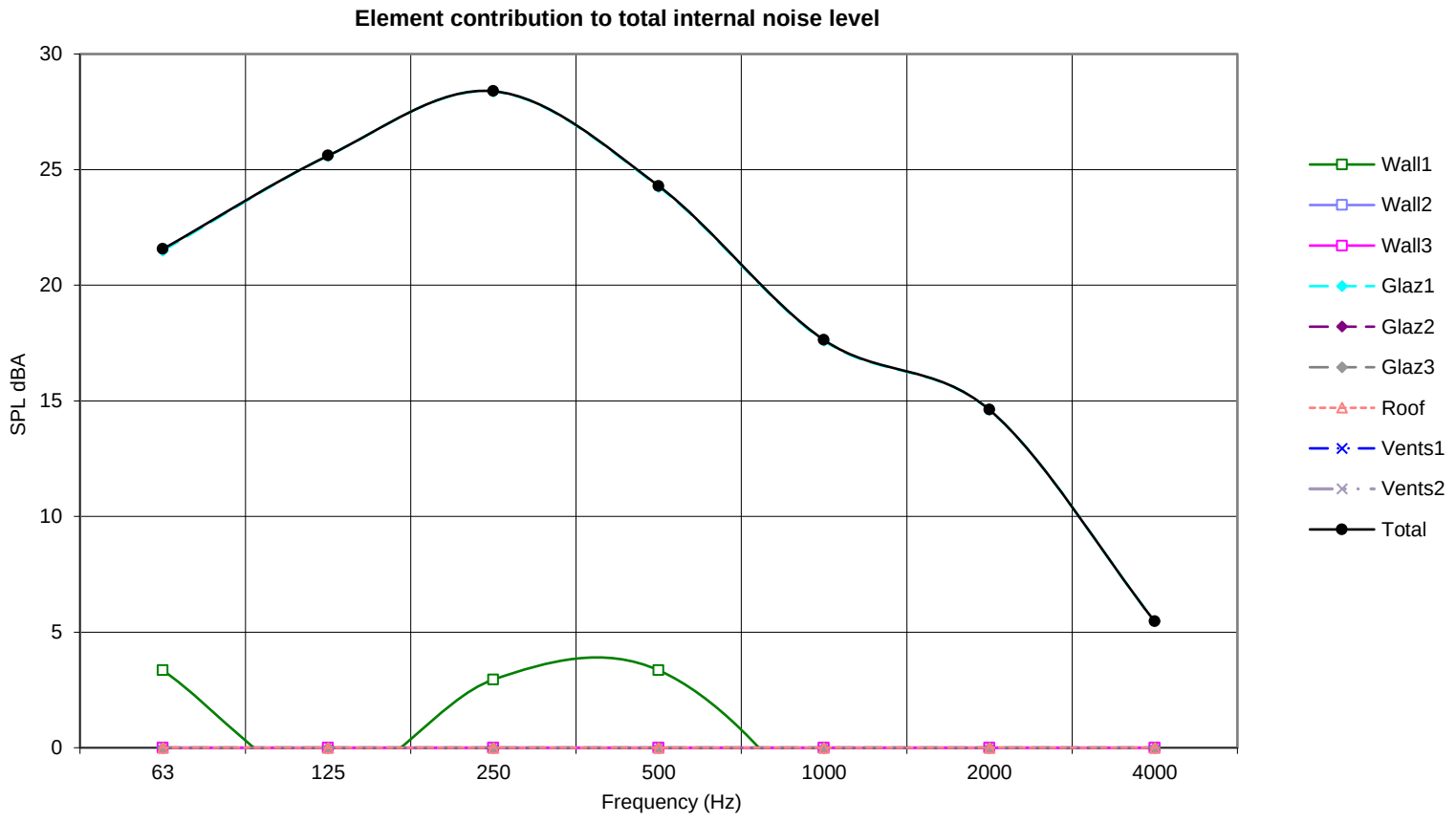
REVERBERATION TIME

DIRECT INPUT ----->								**No data**
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	1.9	36	45	44	47	57	67	77	0%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	5.1	22	22	23	30	40	40	44	99%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		23	23	24	32	42	42	46				
	Resultant SPL inside room excluding ventilators dB	31.9	22	26	28	24	18	15	5	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**31.9**	22	26	28	24	18	15	5



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
CLIENT:	MIDGARD LTD	Room Dimensions [m]	2.7	X	3.0	X	2.6
PROJECT:	Sparkle Street, Manchester						
ROOM:	Bedroom (overlooking Sparkle Street)						
RUN REF:	23244						
VARIANT:	Night-time Average Noise Levels (LAeq,8hr)						

Room Volume =	21.1	m3		
Partition Area =	7.0	m2		
Ventilation ref area =	10.0	m2		
Free Field SPL K =	3	dB		

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	57.0								
		38.8	42.9	46.4	49.8	53.0	50.2	45.0	**Reference spectrum**

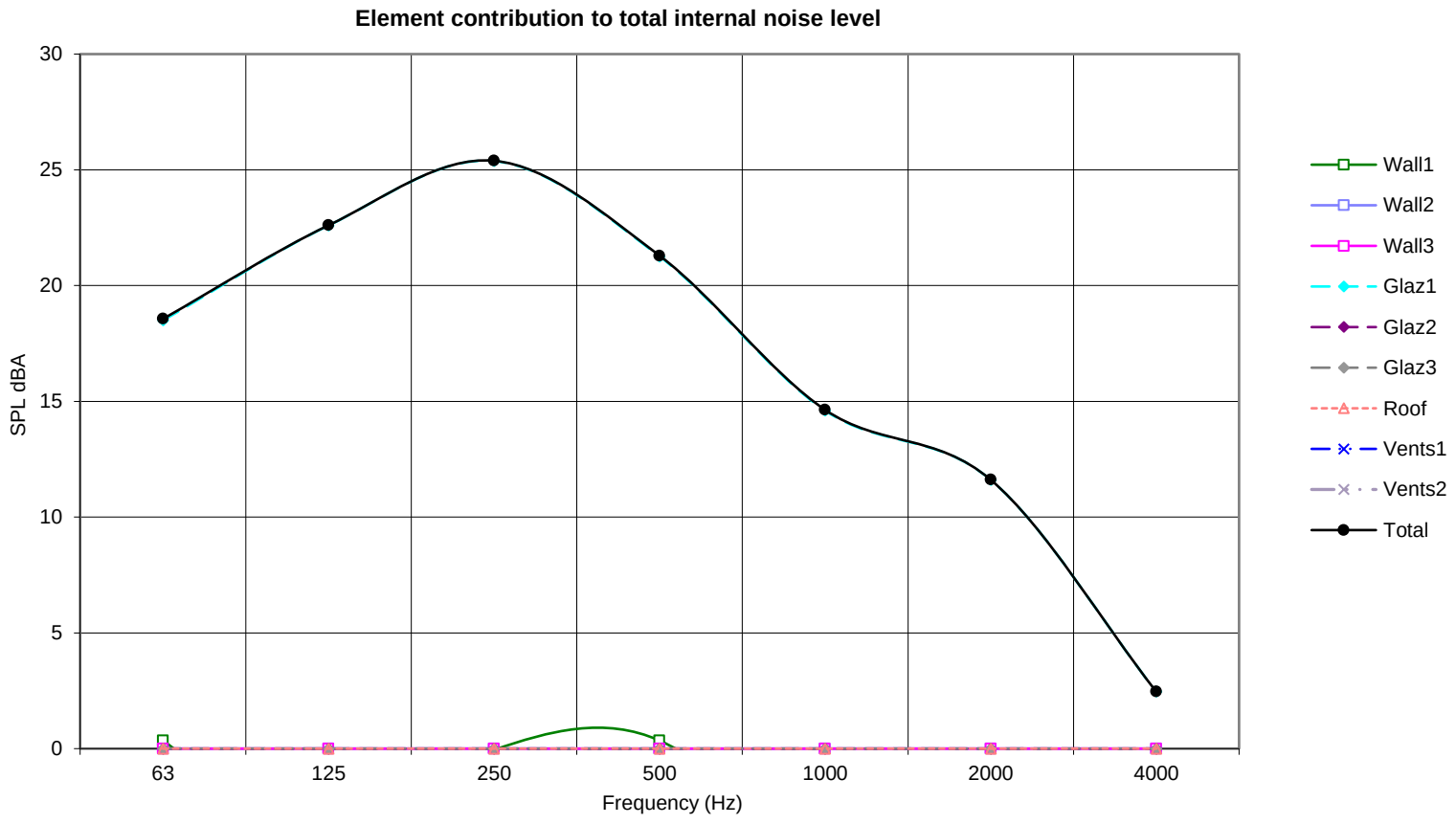
REVERBERATION TIME

DIRECT INPUT ----->								**No data**
EQUAL RT for all bands ----->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	1.9	36	45	44	47	57	67	77	0%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	5.1	22	22	23	30	40	40	44	99%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Resultant composite Façade SRI			23	23	24	32	42	42	46				
Resultant SPL inside room excluding ventilators dB		28.9	19	23	25	21	15	12	2	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Resultant SPL inside room through ventilators dB		-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**28.9**	19	23	25	21	15	12	2



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
CLIENT:	MIDGARD LTD	Room Dimensions [m]	2.7	X	3.0	X	2.6
PROJECT:	Sparkle Street, Manchester						
ROOM:	Bedroom (overlooking Sparkle Street)						
RUN REF:	23244						
VARIANT:	Night-time Maximum Noise Levels (LAmax)						

Room Volume =	21.1	m3	
Partition Area =	7.0	m2	
Ventilation ref area =	10.0	m2	
Free Field SPL K =	3	dB	

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	70.0	56.0	55.1	58.2	63.1	65.5	63.3	58.9	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		56.0	55.1	58.2	63.1	65.5	63.3	58.9	**Direct input**

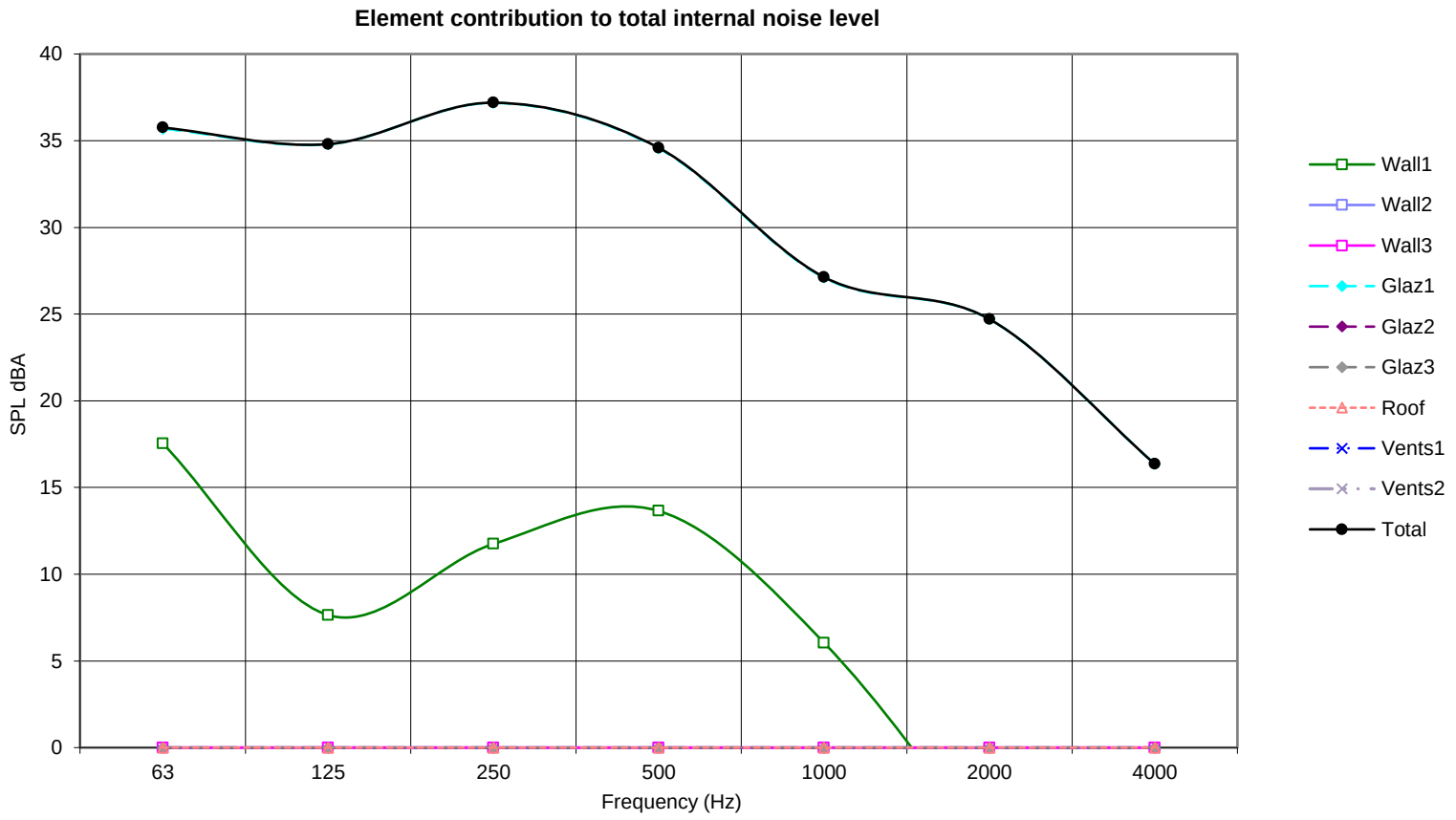
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	1.9	36	45	44	47	57	67	77	1%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	5.1	22	22	23	30	40	40	44	99%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		23	23	24	32	42	42	46				
	Resultant SPL inside room excluding ventilators dB	42.0	36	35	37	35	27	25	16	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**42.0**	36	35	37	35	27	25	16



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H	
CLIENT:	MIDGARD LTD	Room Dimensions [m]	2.7	X	4.8	X	2.6	
PROJECT:	Sparkle Street, Manchester							
ROOM:	Bedroom (3 windows, overlooking Store Street)					Room Volume =	33.7	m3
RUN REF:	23244					Partition Area =	15.9	m2
VARIANT:	Daytime Average Noise Levels (LAeq,16hr)					Ventilation ref area =	10.0	m2
		SELECT Free Field or Façade SPL for model input >>>				Free Field SPL K =	3	dB

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	65.0								
		46.8	50.9	54.4	57.8	61.0	58.2	53.0	**Reference spectrum**

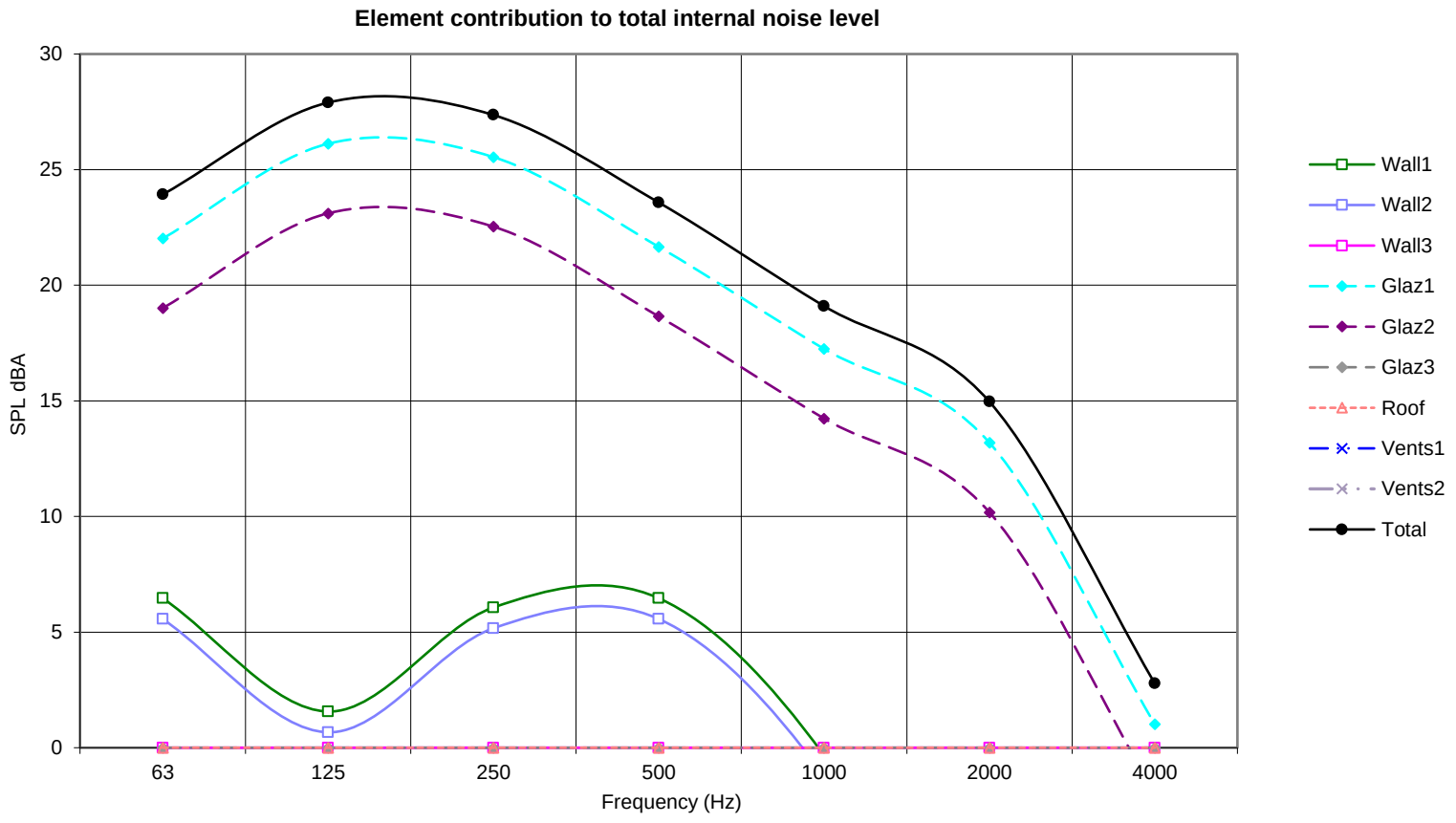
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	2.0	36	45	44	47	57	67	77	1%	54	0	-4
	ATTENUATION												
Wall 2	Typical - 102mm brick/50mm cavity/100mm block	1.6	36	45	44	47	57	67	77	1%	54	0	-4
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	36 dB Rw + Ctr - High Acoustic Performance Double Glazing	8.2	27	27	31	38	46	47	54	65%	36 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	36 dB Rw + Ctr - High Acoustic Performance Double Glazing	4.1	27	27	31	38	46	47	54	33%	36 (inc Ctr)	-	-
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		28	28	32	39	47	48	55				
	Resultant SPL inside room excluding ventilators dB	32.4	24	28	27	24	19	15	3	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**32.4**	24	28	27	24	19	15	3



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
CLIENT:	MIDGARD LTD	Room Dimensions [m]	2.7	X	4.8	X	2.6
PROJECT:	Sparkle Street, Manchester						
ROOM:	Bedroom (3 windows, overlooking Store Street)						
RUN REF:	23244						
VARIANT:	Night-time Average Noise Levels (LAeq,8hr)						

Room Volume =	33.7	m3	
Partition Area =	15.9	m2	
Ventilation ref area =	10.0	m2	
Free Field SPL K =	3	dB	

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	62.0								
		43.8	47.9	51.4	54.8	58.0	55.2	50.0	**Reference spectrum**

REVERBERATION TIME

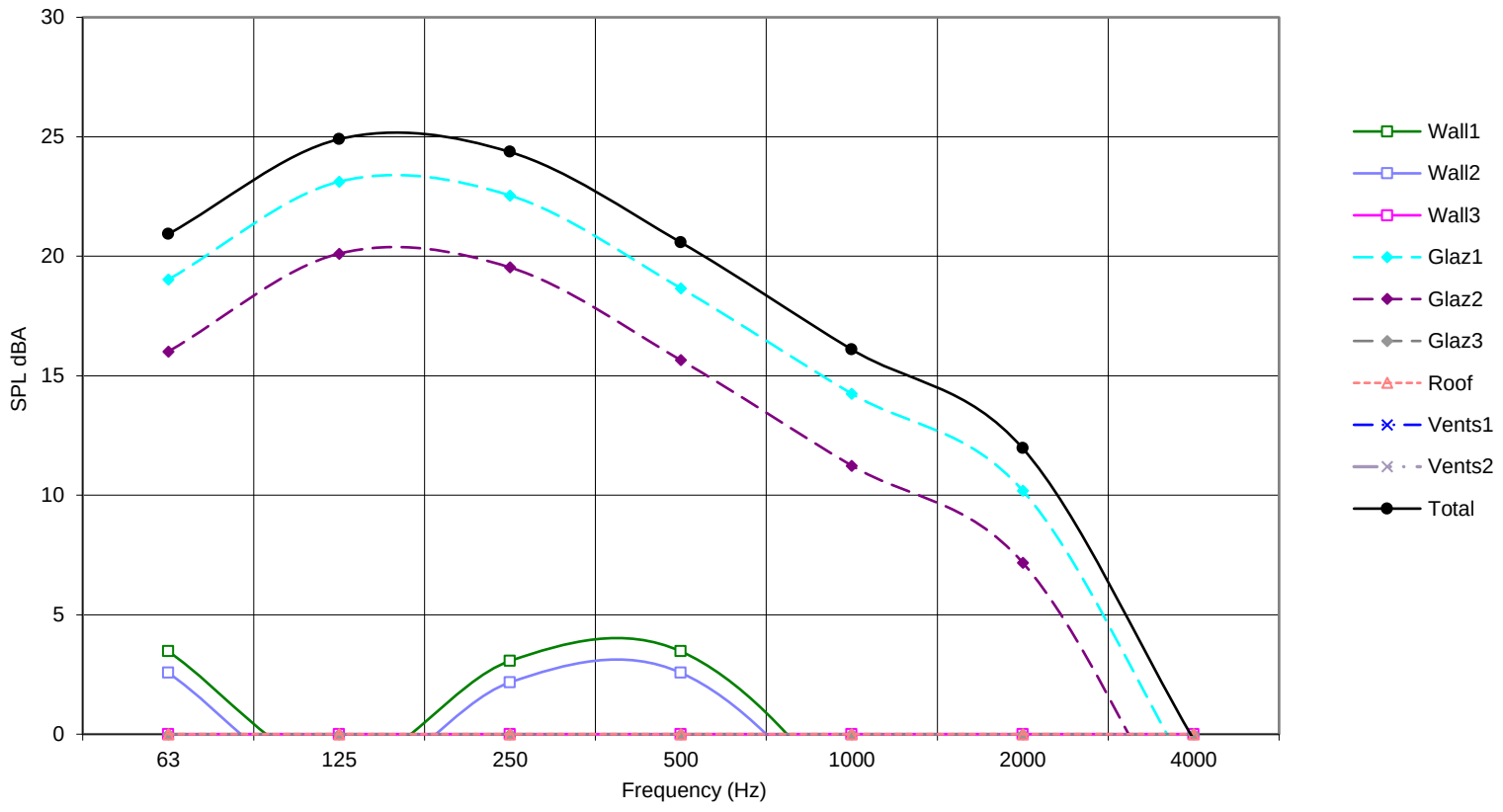
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	2.0	36	45	44	47	57	67	77	1%	54	0	-4
	ATTENUATION												
Wall 2	Typical - 102mm brick/50mm cavity/100mm block	1.6	36	45	44	47	57	67	77	0%	54	0	-4
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	36 dB Rw + Ctr - High Acoustic Performance Double Glazing	8.2	27	27	31	38	46	47	54	66%	36 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	36 dB Rw + Ctr - High Acoustic Performance Double Glazing	4.1	27	27	31	38	46	47	54	33%	36 (inc Ctr)	-	-
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		28	28	32	39	47	48	55				
	Resultant SPL inside room excluding ventilators dB	29.4	21	25	24	21	16	12	0	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**29.4**	21	25	24	21	16	12	0

Element contribution to total internal noise level



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
CLIENT:	MIDGARD LTD	Room Dimensions [m]	2.7	X	4.8	X	2.6
PROJECT:	Sparkle Street, Manchester						
ROOM:	Bedroom (3 windows, overlooking Store Street)						
RUN REF:	23244						
VARIANT:	Night-time Maximum Noise Levels (LAmax)						

Room Volume =	33.7	m3		
Partition Area =	15.9	m2		
Ventilation ref area =	10.0	m2		
Free Field SPL K =	3	dB		

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	77.0	63.0	62.1	65.2	70.1	72.5	70.3	65.9	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		63.0	62.1	65.2	70.1	72.5	70.3	65.9	**Direct input**

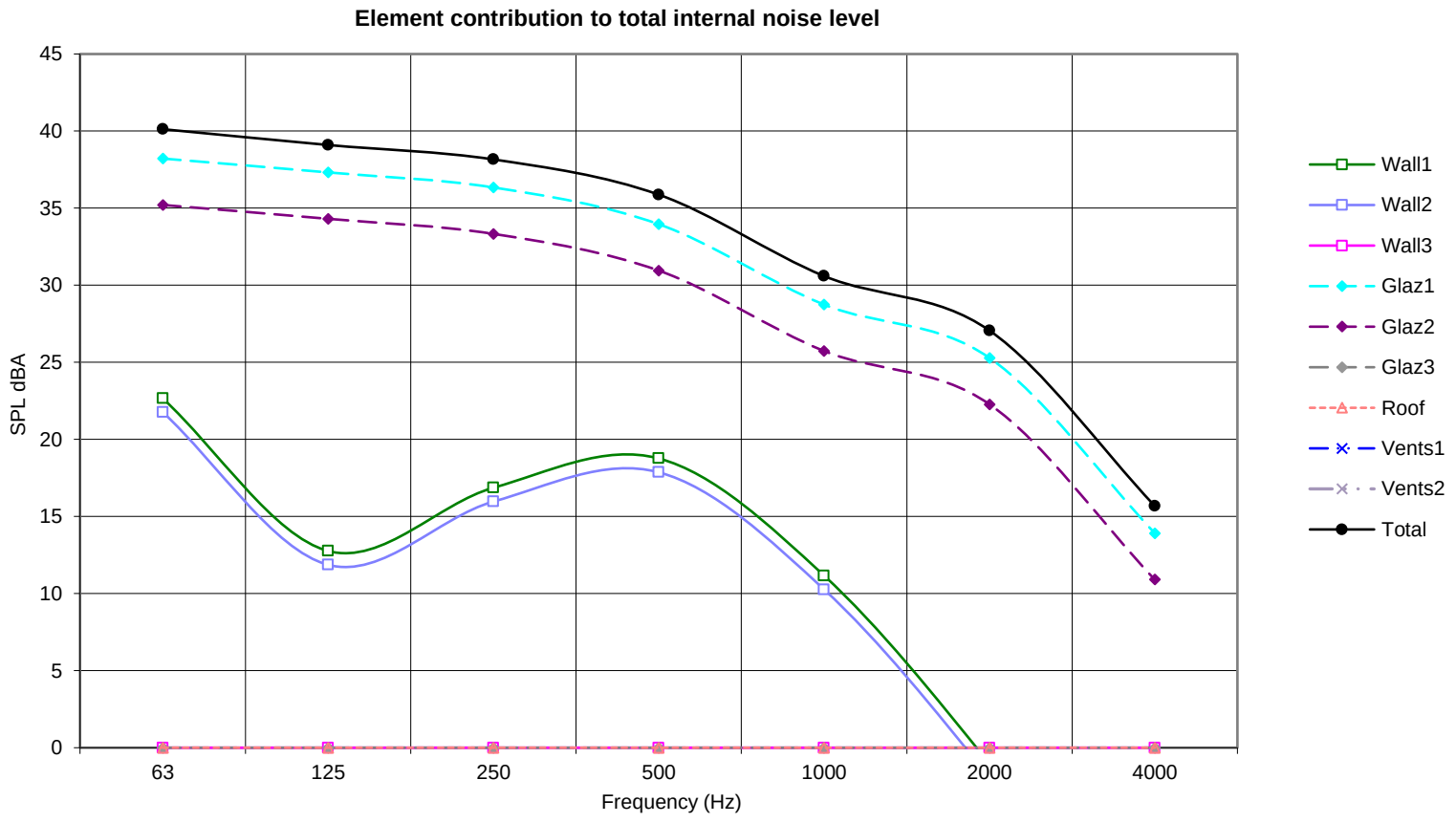
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	2.0	36	45	44	47	57	67	77	1%	54	0	-4
	ATTENUATION												
Wall 2	Typical - 102mm brick/50mm cavity/100mm block	1.6	36	45	44	47	57	67	77	1%	54	0	-4
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	36 dB Rw + Ctr - High Acoustic Performance Double Glazing	8.2	27	27	31	38	46	47	54	65%	36 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	36 dB Rw + Ctr - High Acoustic Performance Double Glazing	4.1	27	27	31	38	46	47	54	33%	36 (inc Ctr)	-	-
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		28	28	32	39	47	48	55				
	Resultant SPL inside room excluding ventilators dB	44.8	40	39	38	36	31	27	16	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**44.8**	40	39	38	36	31	27	16



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H	
CLIENT:	MIDGARD LTD	Room Dimensions [m]	2.8	X	3.7	X	2.6	
PROJECT:	Sparkle Street, Manchester							
ROOM:	Bedroom (Townhouse)					Room Volume =	26.5	m3
RUN REF:	23244					Partition Area =	7.2	m2
VARIANT:	Daytime Average Noise Levels (LAeq,16hr)					Ventilation ref area =	10.0	m2
		SELECT Free Field or Façade SPL for model input >>>				Free Field SPL K =	3	dB

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	65.0								
		46.8	50.9	54.4	57.8	61.0	58.2	53.0	**Reference spectrum**

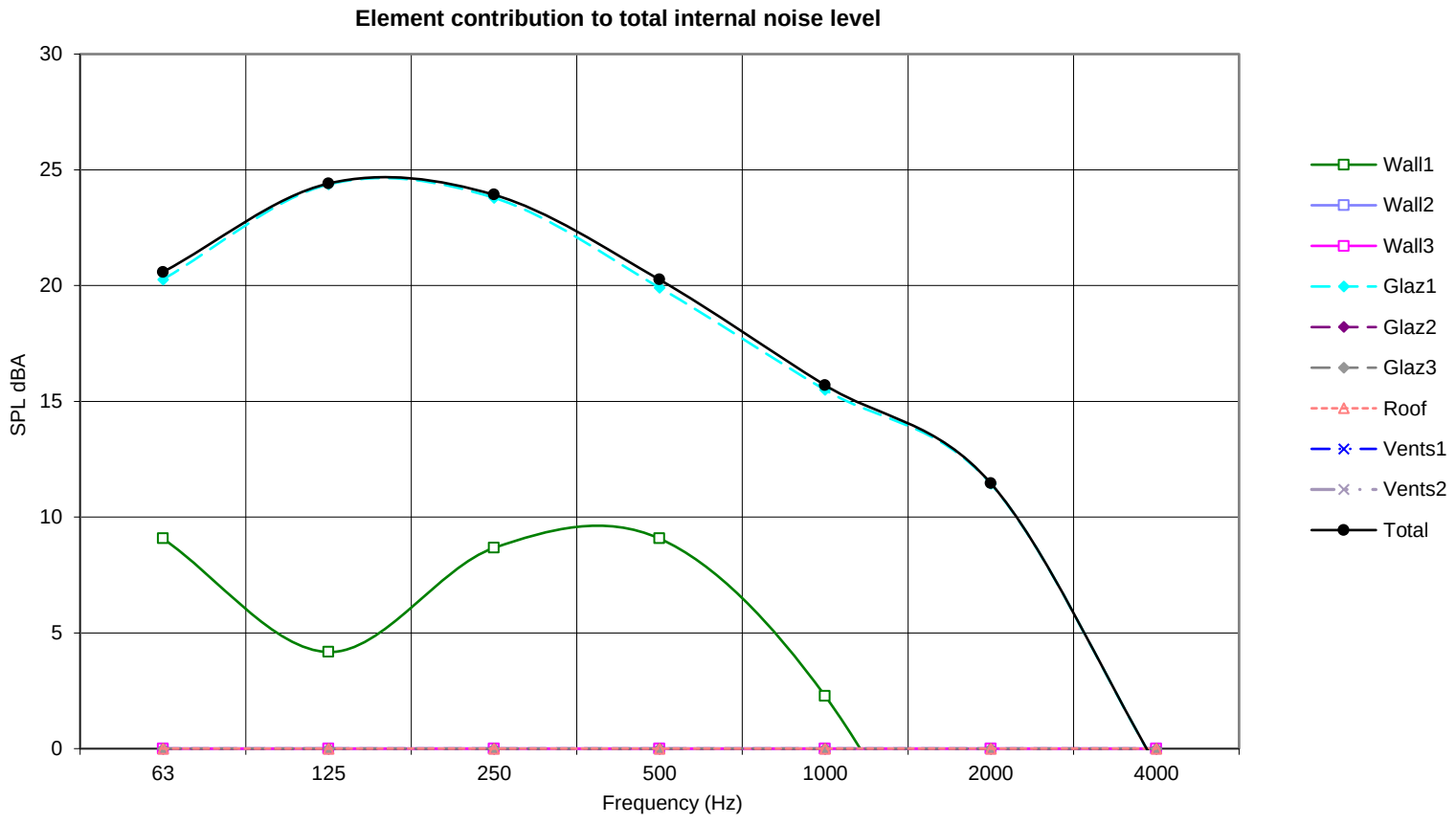
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
	0.5	0.5	0.5	0.5	0.5	0.5	0.5		**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	2.9	36	45	44	47	57	67	77	3%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	36 dB Rw + Ctr - High Acoustic Performance Double Glazing	4.3	27	27	31	38	46	47	54	96%	36 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		28	29	33	40	48	49	56				
	Resultant SPL inside room excluding ventilators dB	29.0	21	24	24	20	16	11	-1	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**29.0**	21	24	24	20	16	11	-1



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
CLIENT:	MIDGARD LTD	Room Dimensions [m]	2.8	X	3.7	X	2.6
PROJECT:	Sparkle Street, Manchester						
ROOM:	Bedroom (Townhouse)				Room Volume =	26.5	m3
RUN REF:	23244				Partition Area =	7.2	m2
VARIANT:	Night-time Average Noise Levels (LAeq,8hr)				Ventilation ref area =	10.0	m2
		SELECT Free Field or Façade SPL for model input >>>			Free Field SPL K =	3	dB

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	62.0								
		43.8	47.9	51.4	54.8	58.0	55.2	50.0	**Reference spectrum**

REVERBERATION TIME

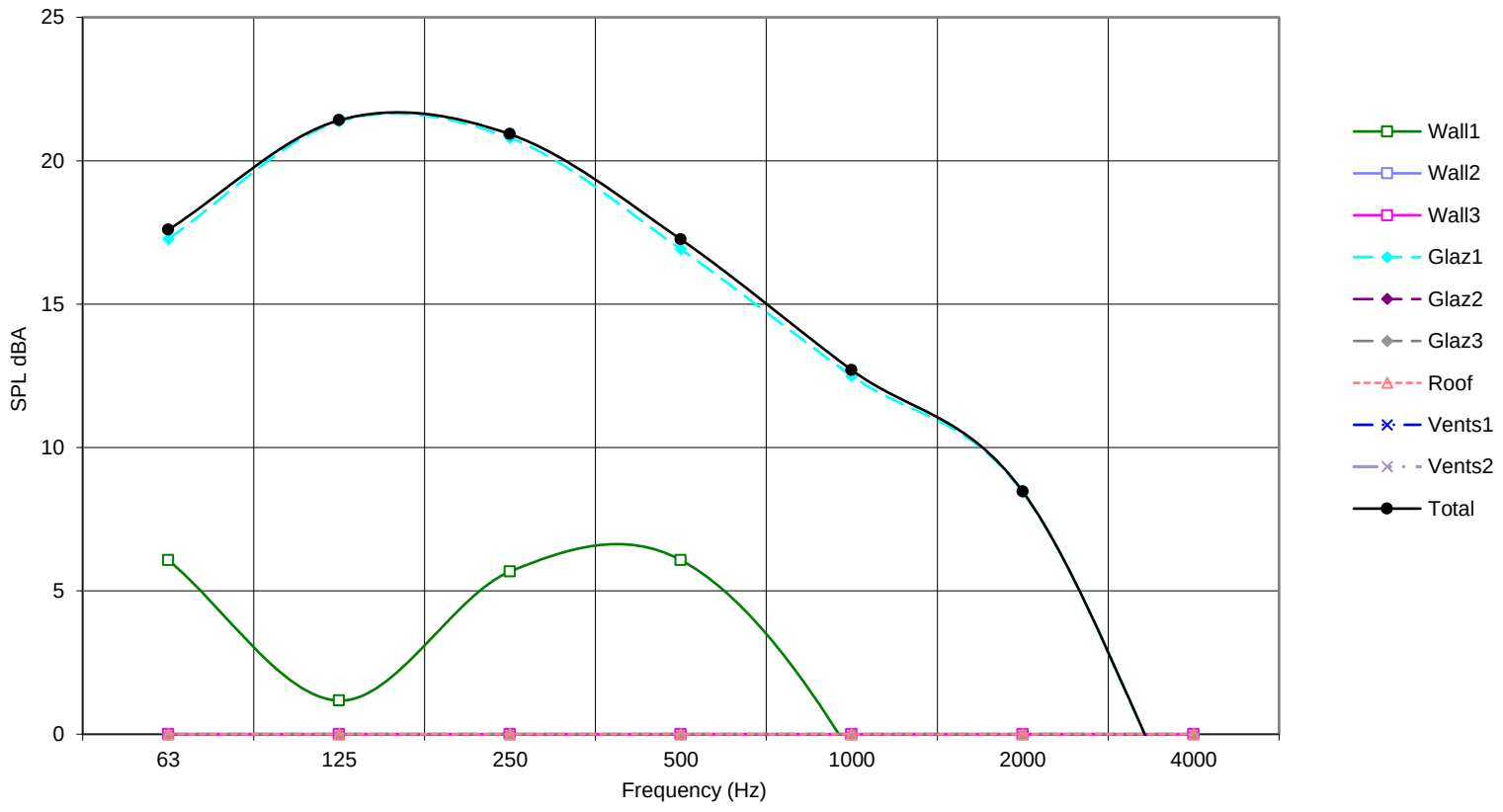
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
	0.5	0.5	0.5	0.5	0.5	0.5	0.5		**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	2.9	36	45	44	47	57	67	77	3%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	36 dB Rw + Ctr - High Acoustic Performance Double Glazing	4.3	27	27	31	38	46	47	54	95%	36 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		28	29	33	40	48	49	56				
	Resultant SPL inside room excluding ventilators dB	26.0	18	21	21	17	13	8	-4	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**26.0**	18	21	21	17	13	8	-4

Element contribution to total internal noise level



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
CLIENT:	MIDGARD LTD	Room Dimensions [m]	2.8	X	3.7	X	2.6
PROJECT:	Sparkle Street, Manchester						
ROOM:	Bedroom (Townhouse)						
RUN REF:	23244						
VARIANT:	Night-time Maximum Noise Levels (LAmax)						

Room Volume =	26.5	m3	
Partition Area =	7.2	m2	
Ventilation ref area =	10.0	m2	
Free Field SPL K =	3	dB	

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	78.0	64.0	63.1	66.2	71.1	73.5	71.3	66.9	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		64.0	63.1	66.2	71.1	73.5	71.3	66.9	**Direct input**

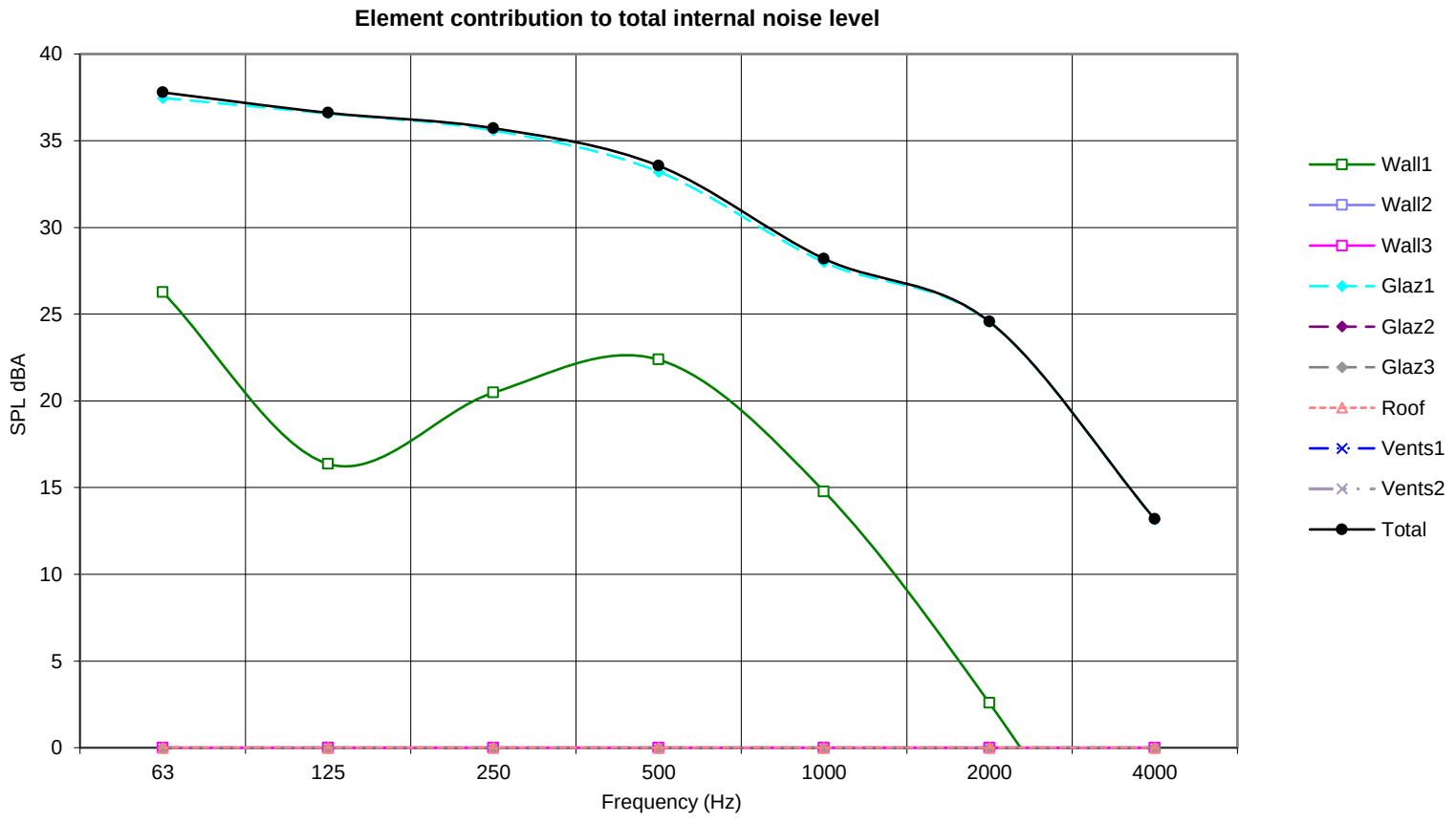
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	2.9	36	45	44	47	57	67	77	4%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	36 dB Rw + Ctr - High Acoustic Performance Double Glazing	4.3	27	27	31	38	46	47	54	96%	36 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		28	29	33	40	48	49	56				
	Resultant SPL inside room excluding ventilators dB	42.4	38	37	36	34	28	25	13	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**42.4**	38	37	36	34	28	25	13



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
CLIENT:	MIDGARD LTD	Room Dimensions [m]	2.7	X	3.0	X	2.6
PROJECT:	Sparkle Street, Manchester						
ROOM:	Bedroom (South facing)	Room Volume =	21.1	m3			
RUN REF:	23244	Partition Area =	7.0	m2			
VARIANT:	Daytime Average Noise Levels (LAeq,16hr)	Ventilation ref area =	10.0	m2			
	SELECT Free Field or Façade SPL for model input >>>	Free Field SPL K =	3	dB			

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	55.0								
		36.8	40.9	44.4	47.8	51.0	48.2	43.0	**Reference spectrum**

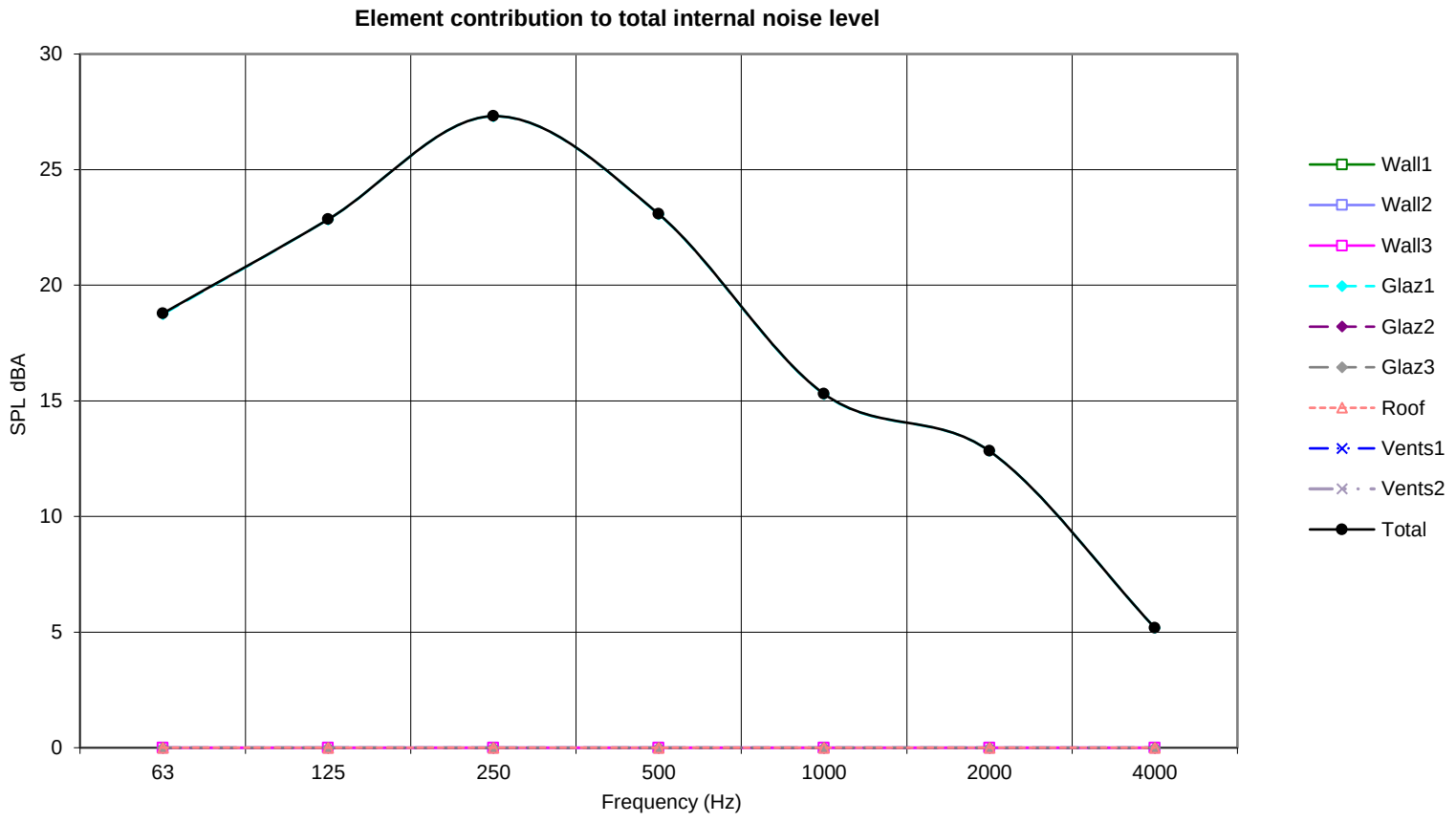
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**	

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	1.9	36	45	44	47	57	67	77	0%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	27 dB Rw + Ctr - Standard Thermal Double Glazing	5.1	20	20	19	27	38	37	40	99%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		21	21	20	28	39	39	41				
	Resultant SPL inside room excluding ventilators dB	30.3	19	23	27	23	15	13	5	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**30.3**	19	23	27	23	15	13	5



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
CLIENT:	MIDGARD LTD	Room Dimensions [m]	2.7	X	3.0	X	2.6
PROJECT:	Sparkle Street, Manchester						
ROOM:	Bedroom (South facing)	Room Volume =	21.1	m3			
RUN REF:	23244	Partition Area =	7.0	m2			
VARIANT:	Night-time Average Noise Levels (LAeq,8hr)	Ventilation ref area =	10.0	m2			
	SELECT Free Field or Façade SPL for model input >>>	Free Field SPL K =	3	dB			

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	51.0								
		32.8	36.9	40.4	43.8	47.0	44.2	39.0	**Reference spectrum**

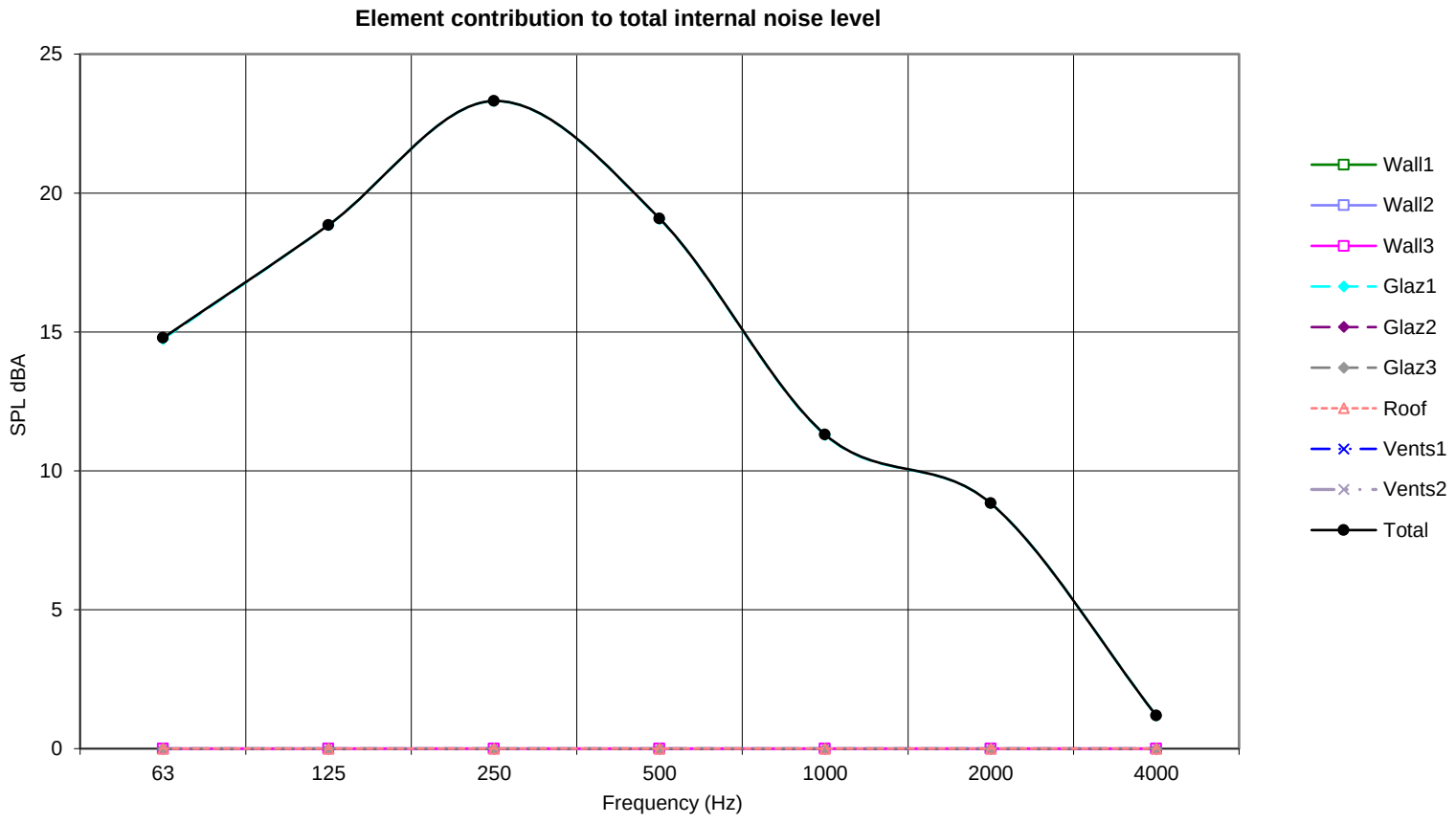
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	1.9	36	45	44	47	57	67	77	0%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	27 dB Rw + Ctr - Standard Thermal Double Glazing	5.1	20	20	19	27	38	37	40	98%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		21	21	20	28	39	39	41				
	Resultant SPL inside room excluding ventilators dB	26.3	15	19	23	19	11	9	1	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**26.3**	15	19	23	19	11	9	1



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H
CLIENT:	MIDGARD LTD	Room Dimensions [m]	2.7	X	3.0	X	2.6
PROJECT:	Sparkle Street, Manchester						
ROOM:	Bedroom (South facing)	Room Volume =	21.1	m3			
RUN REF:	23244	Partition Area =	7.0	m2			
VARIANT:	Night-time Maximum Noise Levels (LAmax)	Ventilation ref area =	10.0	m2			
	SELECT Free Field or Façade SPL for model input >>>	Free Field SPL K =	3	dB			

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	64.0	50.0	49.1	52.2	57.1	59.5	57.3	52.9	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		50.0	49.1	52.2	57.1	59.5	57.3	52.9	**Direct input**

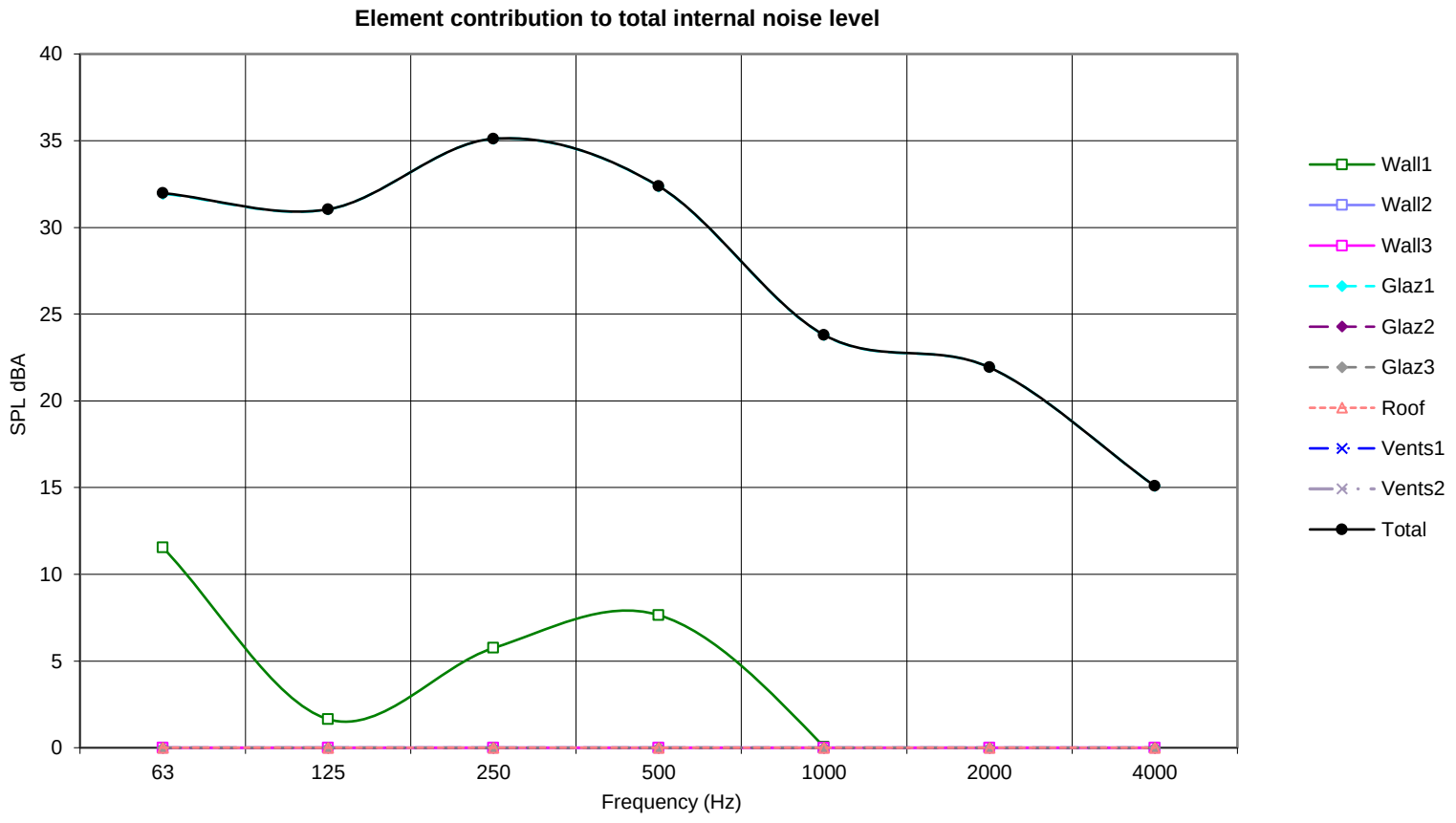
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
	0.5	0.5	0.5	0.5	0.5	0.5	0.5		**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	1.9	36	45	44	47	57	67	77	0%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	27 dB Rw + Ctr - Standard Thermal Double Glazing	5.1	20	20	19	27	38	37	40	100%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		21	21	20	28	39	39	41				
	Resultant SPL inside room excluding ventilators dB	39.2	32	31	35	32	24	22	15	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**39.2**	32	31	35	32	24	22	15



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H	
CLIENT:	MIDGARD LTD	Room Dimensions [m]	5.5	X	3.8	X	2.6	
PROJECT:	Sparkle Street, Manchester							
ROOM:	Living Room (Sparkle Street)				Room Volume =		53.9	m3
RUN REF:	23244				Partition Area =		27.7	m2
VARIANT:	Daytime Average Noise Levels (LAeq,16hr)				Ventilation ref area =		10.0	m2
		SELECT Free Field or Façade SPL for model input >>>			Free Field SPL K =		3	dB

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	60.0								
		41.8	45.9	49.4	52.8	56.0	53.2	48.0	**Reference spectrum**

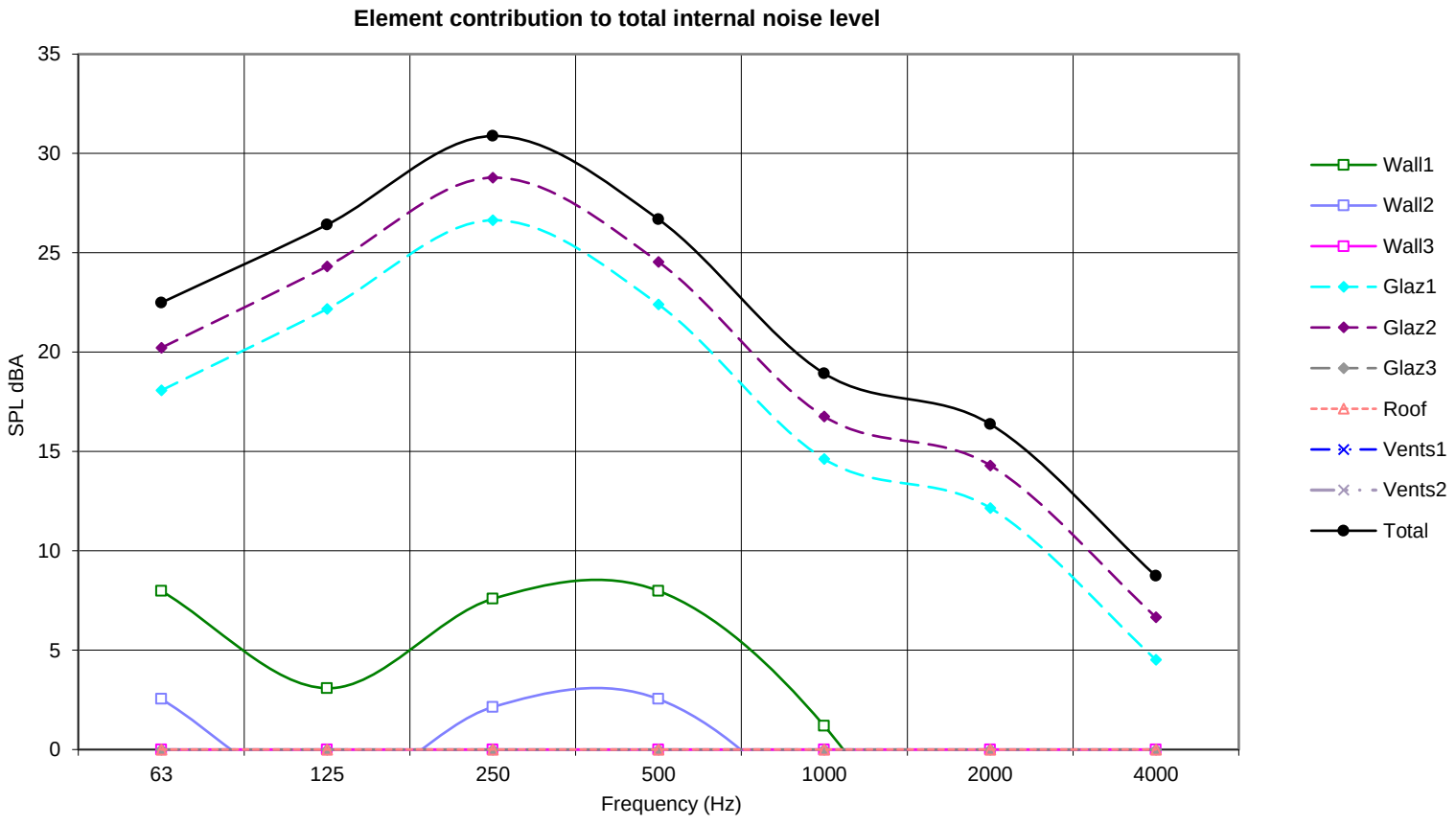
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
	0.5	0.5	0.5	0.5	0.5	0.5	0.5		**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	14.3	36	45	44	47	57	67	77	1%	54	0	-4
	ATTENUATION												
Wall 2	Typical - 102mm brick/50mm cavity/100mm block	4.1	36	45	44	47	57	67	77	0%	54	0	-4
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	27 dB Rw + Ctr - Standard Thermal Double Glazing	3.5	20	20	19	27	38	37	40	37%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	27 dB Rw + Ctr - Standard Thermal Double Glazing	5.8	20	20	19	27	38	37	40	61%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		24	25	24	31	42	42	44				
	Resultant SPL inside room excluding ventilators dB	33.9	22	26	31	27	19	16	9	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**33.9**	22	26	31	27	19	16	9



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H	
CLIENT:	MIDGARD LTD	Room Dimensions [m]	5.5	X	3.8	X	2.6	
PROJECT:	Sparkle Street, Manchester							
ROOM:	Living Room (South facing)	Room Volume =	53.9	m3				
RUN REF:	23244	Partition Area =	27.7	m2				
VARIANT:	Daytime Average Noise Levels (LAeq,16hr)	Ventilation ref area =	10.0	m2				
	SELECT Free Field or Façade SPL for model input >>>	Free Field SPL K =	3	dB				

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	56.0								
		37.8	41.9	45.4	48.8	52.0	49.2	44.0	**Reference spectrum**

REVERBERATION TIME

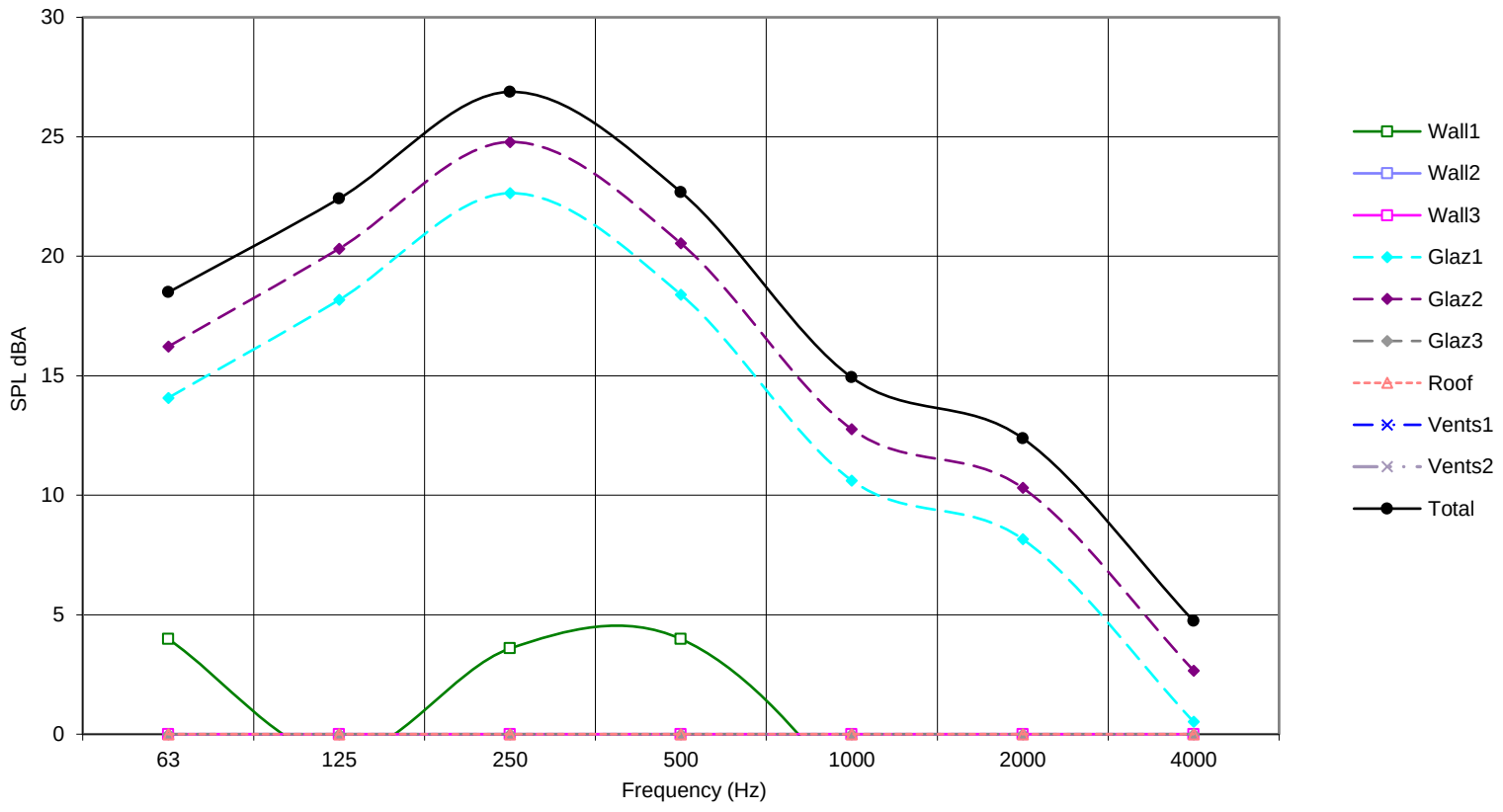
DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	**Default - RT set to 0.5s**	

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	14.3	36	45	44	47	57	67	77	1%	54	0	-4
	ATTENUATION												
Wall 2	Typical - 102mm brick/50mm cavity/100mm block	4.1	36	45	44	47	57	67	77	0%	54	0	-4
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	27 dB Rw + Ctr - Standard Thermal Double Glazing	3.5	20	20	19	27	38	37	40	37%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	27 dB Rw + Ctr - Standard Thermal Double Glazing	5.8	20	20	19	27	38	37	40	61%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		24	25	24	31	42	42	44				
	Resultant SPL inside room excluding ventilators dB	29.9	18	22	27	23	15	12	5	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

Total SPL inside room	**29.9**	18	22	27	23	15	12	5

Element contribution to total internal noise level



FACSIM V2.7.4 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

			W		L		H	
CLIENT:	MIDGARD LTD	Room Dimensions [m]	6.8	X	5.8	X	3.6	
PROJECT:	Sparkle Street, Manchester							
ROOM:	Living Room (Town House, Ground Floor)				Room Volume =		140.9	m3
RUN REF:	23244				Partition Area =		35.5	m2
VARIANT:	Daytime Average Noise Levels (LAeq,16hr)				Ventilation ref area =		10.0	m2
		SELECT Free Field or Façade SPL for model input >>>			Free Field SPL K =		3	dB

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ----->	-								**No data**
Road traffic spectrum (according to BS 8233:1999 section 6)	65.0								
		46.8	50.9	54.4	57.8	61.0	58.2	53.0	**Reference spectrum**

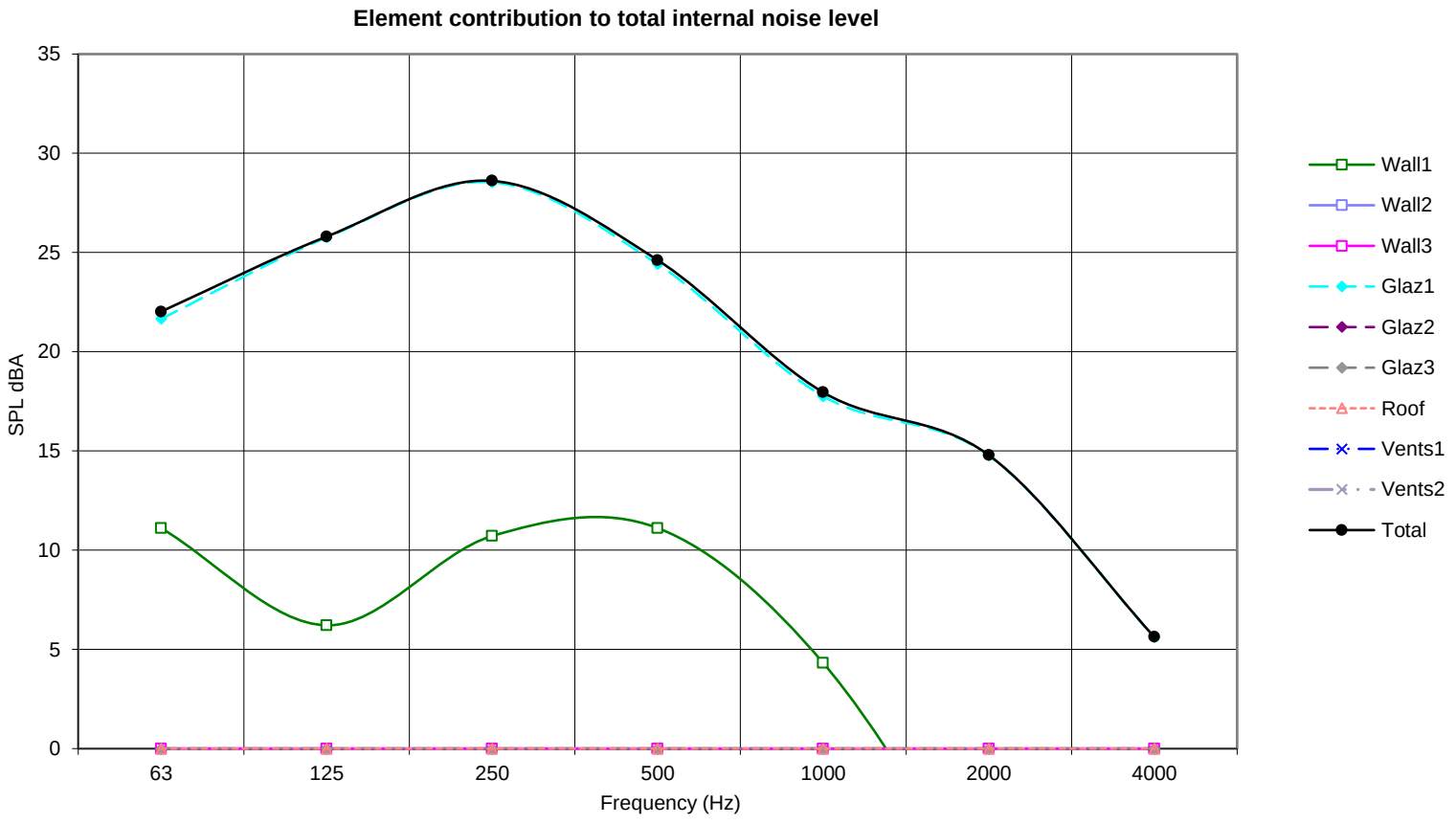
REVERBERATION TIME

DIRECT INPUT ----->									**No data**
EQUAL RT for all bands ----->									
	0.5	0.5	0.5	0.5	0.5	0.5	0.5		**Default - RT set to 0.5s**

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	24.3	36	45	44	47	57	67	77	3%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	30 dB Rw + Ctr - Acoustically Upgraded Double Glazing	11.2	22	22	23	30	40	40	44	97%	30 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		27	27	28	35	45	45	49				
	Resultant SPL inside room excluding ventilators dB	32.2	22	26	29	25	18	15	6	100%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation			0	0	0	0	0	0	0	0%			
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	-99.0	-96	-96	-96	-96	-96	-96	-96	0%			

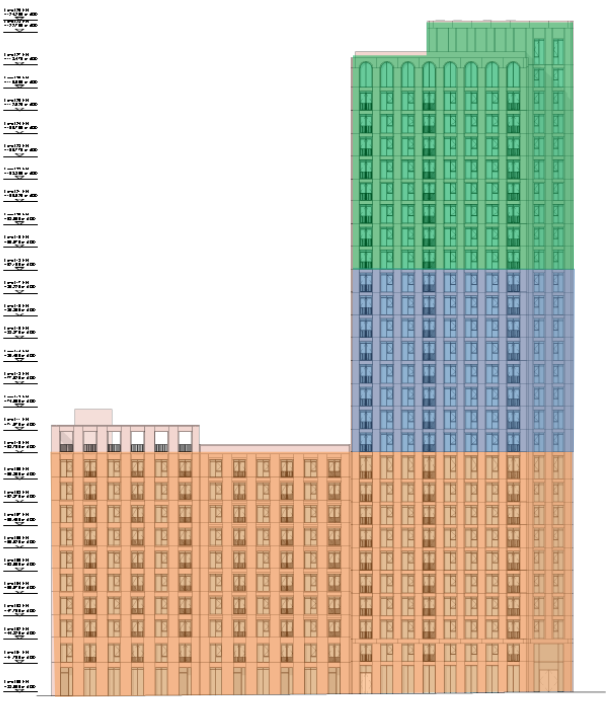
Total SPL inside room	**32.2**	22	26	29	25	18	15	6



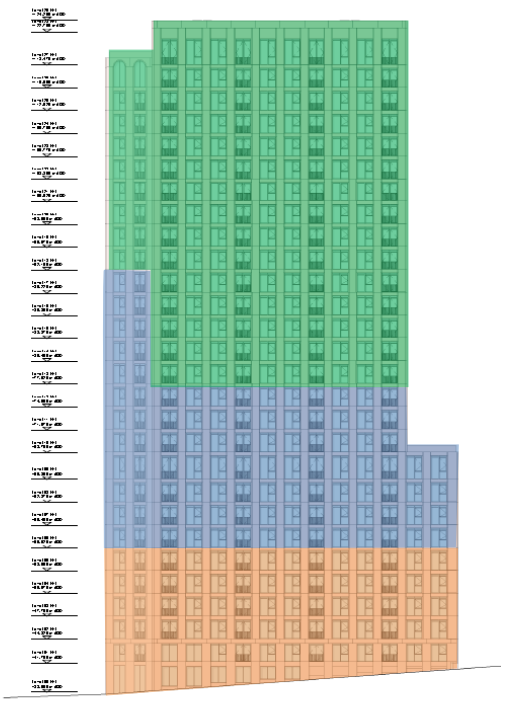
Appendix 5 Acoustic Facade Specification

		Bedroom	Living Room
Reference	**Colour**	**Glazing Specification**	**Glazing Specification**
FS01		36 dB Rw+Ctr	30 dB Rw+Ctr
FS02		30 dB Rw+Ctr	27 dB Rw+Ctr
FS03		27 dB Rw+Ctr	

NOTES: Values must include the Ctr correction. Manufacturers or suppliers should provide laboratory test data demonstrating that the proposed systems are capable of achieving the values given. Windows should be tested as complete systems (rather than just the glazing in isolation).



STORE STREET ELEVATION

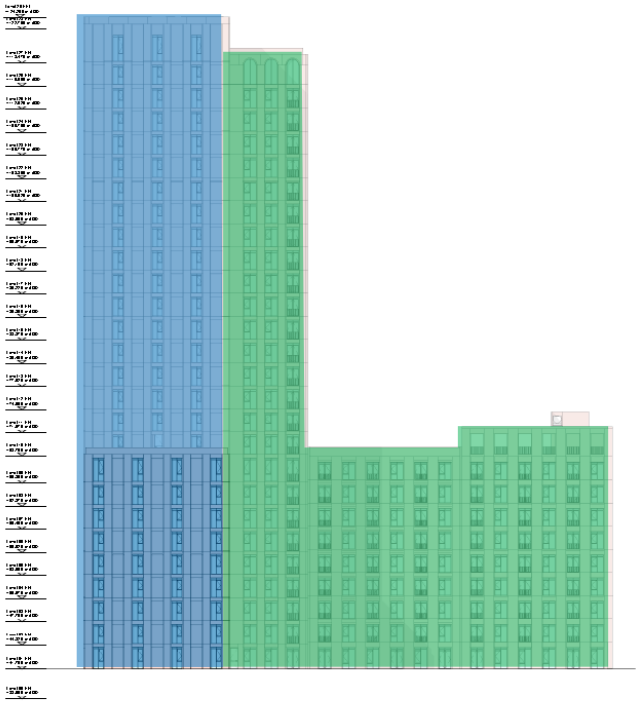


SPARKLE STREET ELEVATION

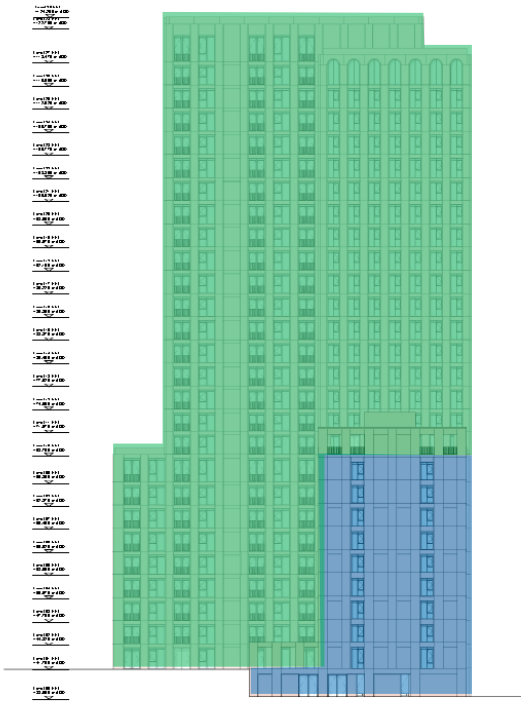
		Bedroom	Living Room
Reference	**Colour**	**Glazing Specification**	**Glazing Specification**
FS01		36 dB Rw+Ctr	30 dB Rw+Ctr
FS02		30 dB Rw+Ctr	27 dB Rw+Ctr
FS03		27 dB Rw+Ctr	

NOTES:

Values must include the Ctr correction. Manufacturers or suppliers should provide laboratory test data demonstrating that the proposed systems are capable of achieving the values given. Windows should be tested as complete systems (rather than just the glazing in isolation).

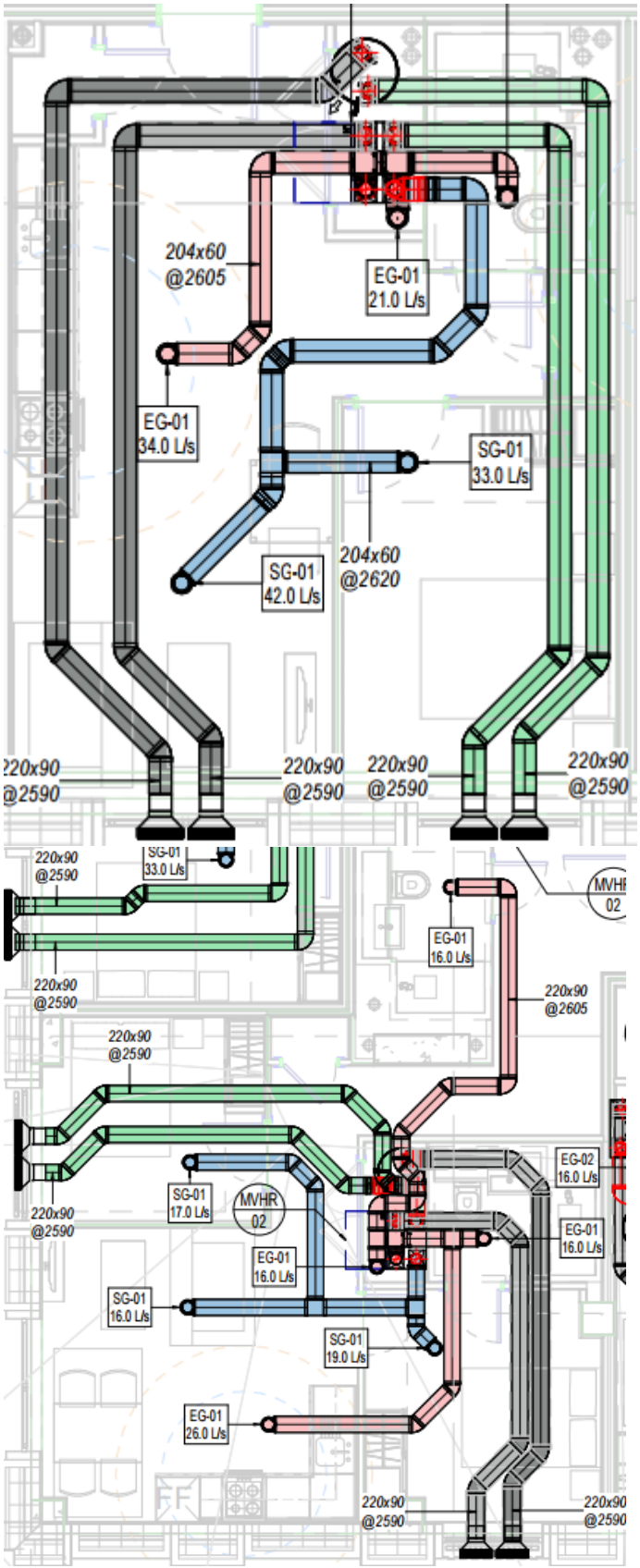


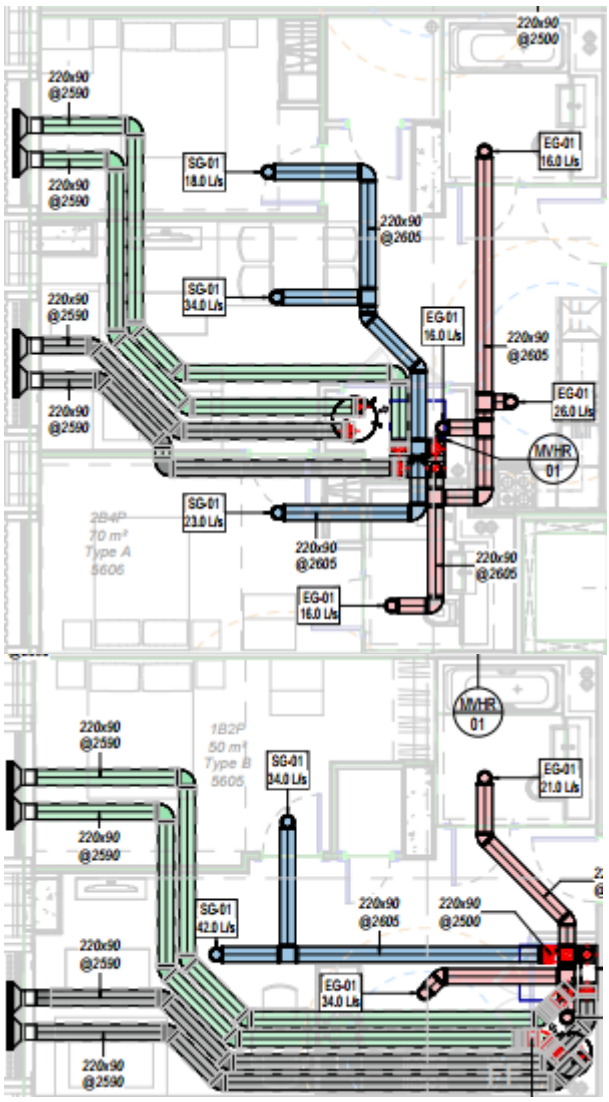
SOUTHEAST ELEVATION



NORTHEAST ELEVATION

Appendix 6 Typical Duct Layouts




220x90
@2590
220x90
@2590
220x90
@2590
220x90
@2590
220x90
@2590
SG-01
18.0 L/s
SG-01
34.0 L/s
SG-01
23.0 L/s
220x90
@2605
220x90
@2605
220x90
@2605
EG-01
16.0 L/s
EG-01
16.0 L/s
EG-01
26.0 L/s
220x90
@2605
MVHR
01
2B4P
70 m²
Type A
5605
EG-01
16.0 L/s
220x90
@2500
MVHR
01
220x90
@2590
220x90
@2590
220x90
@2590
220x90
@2590
1B2P
50 m²
Type B
5605
SG-01
34.0 L/s
SG-01
42.0 L/s
220x90
@2605
220x90
@2500
EG-01
21.0 L/s
EG-01
34.0 L/s

Appendix 7 Noise Data for MVHR

MVHR running at 80%

Sound Data (Unit only)

Unit setting	Test mode	Octave band, Hz, dB SWL									SPL dB(A)
		63	125	250	500	1k	2k	4k	8k	LwA	at 3m
20%	Supply	54.4	60.9	50.6	45.9	34.3	23.6	19.1	24.5	51.3	30.8
	Extract	48.4	56.7	43.7	35.9	21.4	16	18.7	24.5	42.3	24.8
	Breakout	42.6	40.2	39.6	38	31.1	24.3	19.4	24.6	35.1	17.6
40%	Supply	61.6	64.6	58.4	55.5	45.9	37.2	24.7	25.1	58.8	38.3
	Extract	54.9	62.2	51.5	44.8	32.1	24.1	19.7	24.6	48.8	31.3
	Breakout	51.1	49.3	48.9	45.9	41.3	35.7	26.7	25.6	44.0	26.5
60%	Supply	67.5	67.5	73.2	62.4	53.4	47.5	33.5	28.3	69.2	48.7
	Extract	62.5	61.7	60.1	51.1	39.2	32.1	23.2	24.8	54.0	36.5
	Breakout	54.9	53	58.4	55.1	49.7	43.9	35.4	31.9	52.8	35.3
80%	Supply	70.5	71.1	73.8	66.5	58.3	53.2	39.7	33.3	71.3	50.8
	Extract	68.4	65.9	71.8	55.6	43.6	37.1	27.3	25.5	63.8	46.3
	Breakout	59.2	56.8	63.6	57.3	54.2	49	41	37.5	56.8	39.3
100%	Supply	72.8	73.1	75.2	70.4	61.6	56.6	44.2	37.6	73.9	53.4
	Extract	71.7	69	71.8	57.4	45.7	39.9	30.9	26.6	64.1	46.6
	Breakout	61.2	58.8	67.9	59.6	56.7	52.2	44.4	41.2	60.1	42.6

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Cass Allen
01234 834 862
www.cassallen.co.uk